

COLONY & PROTECTORATE
OF KENYA.



ANNUAL REPORT
OF THE
DEPARTMENT of AGRICULTURE
FOR THE
YEAR ENDED 31ST DECEMBER,
1923.

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REPORT OF ACTING DIRECTOR.

STAFF.

The principal staff changes and new appointments during the year under review were:—

Early in the year Mr. C. J. Monson, Personal Assistant, Mr. J. Johnston, Manager, Kabete Experimental Farm, and Mr. E. D'Souza, 2nd Grade Clerk, proceeded on leave pending retirement. Mr. J. W. Sparrow left the Service about the middle of the year.

Appointments:—Mr. F.B.L. Butler, F.L.S., Agricultural Instructor, transferred to the post of Agricultural Supervisor, and Messrs. T. M. W. Sheppard, W. Lyne Watt, B. H. Frowd, H. Boedeker, and A. S. Hartley, were appointed Agricultural Supervisors during the year.

Mr. Teague was appointed Grader and Inspector.

**(2) VETERINARY ADMINISTRATIVE AND
EXECUTIVE DIVISION.**

Mr. H. H. Brassey Edwards, was appointed Acting Deputy Chief Veterinary Officer on the 24.10.23, when Lieut. Colonel A. G. Doherty, Deputy Chief Veterinary Officer, proceeded on leave.

Captain W. E. Phipps, Veterinary Officer, resigned from the Service with effect from 20th August, 1923, and Mr. E. E. Bladen Taylor, Stock Inspector, resigned with effect from 29th December, 1923.

The following additional Stock Inspectors were employed for the periods shown for special duty in the Meru Native Reserve:—

Mr. H. J. Vernon,	24.1.23 to 31.12.23.
Mr. C. B. Jolley,	24.1.23 to 31.12.23.
Mr. T. Lloyd,	24.1.23 to 31.5.23.
Mr. W. N. Cole-Currie,	30.1.23 to 30.11.23.
Mr. P. J. Battelle,	1.6.23 to 30.11.23.

July, 1923.

(3) DIVISION OF VETERINARY RESEARCH.

Mr. W. Kearney, M.R.C.V.S., Assistant Chief Veterinary Research Officer was appointed to the post of Chief Veterinary Research Officer during the absence on leave of Mr. J. Walker, M.R.C.V.S., with effect from the 9th July, 1923.

Mr. J. T. C. Bradshaw, M.R.C.V.S., Veterinary Research Officer, was appointed to the post of Assistant Chief Veterinary Research Officer, vice Mr. W. Kearney, Acting Chief Veterinary Research Officer, with effect from the 9th

The post of one Veterinary Research Officer remained unfilled throughout the year.

FINANCIAL.

The Department commenced the year with a "bed rock" estimate of expenditure and its activities were limited by that allotment. Nevertheless essential services were maintained and developments, particularly in native areas, were prominent.

The statements of Expenditure and Revenue for the fiscal year under review are given hereunder:—

EXPENDITURE.

	Amount Sanctioned.	Amount spent.
	£	£
Administrative and General	15,195	15,052
Native Agriculture	6,756	5,123
Henry Scott, Agricultural Laboratories,		
(a) Botanical Division	984	855
(b) Entomological Division	1,245	1,158
(c) Plant Breeding Branch	1,482	3,393
Contributions to Imperial Bureaus of		
Mycology and Entomology	—	—
Grading and Inspection	—	314

VETERINARY.

(a) Administrative and Executive Division	22,551	21,687
(b) Native Reserves	10,374	8,665
(c) Research Division	25,110	21,026
(d) Division of Veterinary Advisor ..	825	418
Total Agricultural Department	<u>£84,522</u>	<u>£77,692</u>

REVENUE.

	Estimated.	Collected.
	£	£
Sale of farm produce and stock	200	1,582
Agricultural produce, grading fees ..	—	362
Testing, Dipping fees, &c.,	12,000	6,383
Sale of Sera, Vaccines, &c.,	4,000	4,684
	<u>£16,200</u>	<u>£13,011</u>

GENERAL.

The year 1923, marks a period of steady progress and growing enthusiasm amongst producers both European and Native. Large tonnages of agricultural produce were moved down the Railway and exported with the result that that system was working at fairly heavy pressure. In 1923, the daily movement to the Coast from Nairobi averaged 450 tons of produce per day, a certain amount of which tonnage must be credited to collections in the lake area of Tanganyika and the whole of Uganda. Towards the end of the year pressure became accentuated. Activity is manifest throughout the country, the construction of new lines undoubtedly influencing the settler population to greater effort.

Indian agricultural workers are but few in number and the lands available are not all in use. Areas of this country are undoubtedly suitable for such peoples, and if they will exhibit the enterprise necessary and undertake the burden and risk of agricultural work there is a place for them in the Agricultural development of the country.

The following table shewing the declines and increases in quantities of imported foodstuffs is of interest:—

QUANTITY.

VALUE, £.

	1923	1922	1921	1920	1919	1914.	1923	1922	1921	1920	1919	1914.	
Wheat	Cwts.	1,983	900	1,352	337	681	5,585	1,590	879	1,900	515	845	3,091.
Wheat Meal and													
Flour	"	47,599	59,274	78,069	76,823	83,171	81,898	40,362	63,188	102,025	112,795	94,989	52,890.
Ham and Bacon	"	5	8½	20	118	23	701	73	118	285	1,368	205	4,256.
Butter	lbs.	560	2,744	11,981	3,890	43,820	34,997	74	282	1,383	515	4,213	1,972.
Cheese.	"	1,456	1,064	2,561	12,636	4,449	38,836	180	118	354	922	167	1,820.
Ghee	cwts.	5,253	816½	1,878	600	3,075	2,347	13,717	6,522	13,900	5,310	8,202	8,702.
Condensed Milk	"	3,105	1,305	4,560	5,210	5,308	9,468	11,912	5,247	25,076	22,554	23,032	20,498.
Sugar	"	31,652	65,347	65,958	47,921	71,651	74,485	54,041	82,288	129,869	167,554	126,849	54,829.

The Agricultural year 1923, was well up to average in yields of crops, in many places records were made. As the area under cultivation extends and each district progresses to its fair proportion of production there will be a tendency for a closer average to be maintained. Native production is mainly significant for the two reserves of Nyanza and Kikuyu. In parts of the Nyanza reserves there was a long cold and wet season which reduced the quantity of material produced although there was a large excess over domestic requirements. There was an increase in the volume of production, but yields per acre are very difficult to estimate, however they are low.

It is increasingly clear that the productive power of this Colony is very great and foresight is essential to anticipate the service necessary to a proper handling of its productions.

AGRICULTURAL CENSUS.

The fourth Annual Census for 1922/23 which includes Agricultural Export returns for the full year 1923, has been published.

The total acreage available for alienation to Europeans is some seven millions of which four and a half millions have been allotted. Of this allotment 3,985,371 acres are in occupation shewing an increase of 181,000 acres over the previous year. The number of occupiers has increased from 1,380 to 1,466.

The total area cultivated is 274,139 acres giving an average of 187 acres per occupier as against 169 and 154 for 1922 and 1921 respectively. Including the development accounted for by livestock and based upon six acres per head for cattle and three acres per head for small stock, the total average acreage per occupier developed is 1,278 acres.

The figures for individual crops shew that Maize, Coffee and Sisal as heretofore are the three main crops in which notable increases in acreage and production are manifest. Wheat also shews a 50% increase in acreage.

AGRICULTURAL EXPORTS.

The schedule furnished shews comparative quantities and values of agricultural products exported from Mombasa and Kilindini over the period July 1913 to June 1914 and for calendar years 1914, and 1919 to 1923 inclusive.

Comparative statement shewing quantity and approximate value of
Agricultural commodities from the Colony and Protectorate
December, 1914 and 1919-1923 inclusive.

		QUANTITY.				
		1923.	1922.	1921.	1920.	1919.
Animals, living :						
Cattle	No.	2,052	70	7	1	2
Sheep & goats	No.	15,777	438	553	609	331
Horses	No.					
Mules	No.	6	3	7	1	2
Donkeys	No.					
Camels	No.					
Miscellaneous	No.	255	118	207	57	72
Bacon and ham	cwts.	660	925	736	—	5
Butter	lbs.	55,888	18,768	2,634	—	—
Cheese	lbs.	44,128	22,314	7,462	—	200
Coconuts	No.	64,288	69,440	80,218	106,450	53,203
Coffee	cwts.	139,060	77,902	98,987	106,386	71,545
Copra	cwts.	13,457	13,960	4,702	10,250	35,130
Cotton	cwts.	605	500	—	—	—
Fibres :						
Sisal	cwts.	176,400	179,400	134,722	108,049	89,621
Flax	cwts.	21,270	38,500	8,818	6,029	9,352
Grains :						
Beans and peas	cwts.	See Pulse	7,545	6,756	62,546	26,861
Ground nuts	cwts.	39,160	21,403	4,204	1,790	—
Maize	cwts.	870,701	387,718	52,363	335,408	55,776
Millet	cwts.	13,573	2,537	1,698	8,152	246
Pulse	cwts.	30,024	3,942	2,042	13,062	2
Sim-Sim	cwts.	52,660	2,033	17,611	35,777	26,747
Wheat	cwts.	93	386	121	908	136
Miscellaneous	cwts.	1,451	1,931	3	141	848
Hides	cwts.	35,301	20,279	10,878	24,787	23,911
Oil :						
Simsim	galls.	12,829	—	7,242	2,469	1,594
Potatoes	cwts.	22,349	16,061	22,517	30,889	26,232
Seeds :						
Castor	cwts.	200	—	1,205	—	—
Flax	cwts.	5,840	8,020	2,816	280	2
Rubber	cwts.	—	—	—	—	—
Skins :						
Sheep & goats	No.	568,609	194,656	571,648	515,536	491,682
Miscellaneous	No.	593	4,011	9,269	11,289	5,886
Tobacco	cwts.	32	69	32	95	130
Wattle Bark	cwts.	17,794	9,414	—	9,025	4
Wool	cwts.	4,387	5,660	1,807	3,351	4,795

Approx : Tonnage 72,262 39,881 18,603 *37,846 18,567 8

* Proportion of increase due to clearance of accumulated stocks.

The total value of exports £1,325,440 for 1923 shews an increase of £401,300 over that for the previous year, the increase in tonnage of crops exported being 32,381 tons or 81.16% over 1922.

For a few years a comparison of tonnages is sounder than one of values on account of the enormous fluctuations in value which have taken place.

In comparing figures of quantities of the main products exported during 1922 with those of 1923 the following increases and decreases (percentages) are indicated:—

	Increase per cent.	Decrease per cent.
Bacon & Ham	—	29
Butter	197	—
Cheese	98	—
Coffee	78	—
Cotton	21	—
Flax	—	44
Grains (excluding Maize)	432	—
Groundnuts	83	—
Hides	74	—
Linseed	—	27
Maize	124	—
Potatoes	38	—
Sisal	—	1.7
Skins	186	—
Tobacco	—	53
Wattle Bark	89	—
Wool	—	22

METEOROLOGICAL.

The continuance of financial stringency again militated against the establishment of new controlled Meteorological Stations and the issue of observing instruments has likewise been curtailed. The number of Stations operating during the year was 230 comprised as follows:—

	Stations.
(a) Agricultural, Forestal and Public Works	18
(b) District and Military Stations	42
(c) Railway	18
(d) Private	152
Total	230

The Annual Meteorological Reports which contain a mass of valuable information are published up-to-date, the 1923 Report being already printed and distributed.

The following table gives a concise record of weather conditions which were observed in various parts of the Colony and Protectorate during the year. It will be observed that in nearly every district the rain precipitation during the year was considerably in excess of the average taken over a period of years.

LAND SETTLEMENT.

Again an increase in the number of occupiers of land is recorded somewhat larger than in 1922, the number having increased from 1,386 in 1922 to 1,466 in 1923. The Colony is very attractive and should receive the attention of practical men who desire to establish themselves on their own properties or to become the tenants of land-holders.

AGRICULTURAL SHOWS.

Owing to the outbreak of Foot and Mouth Disease which occurred in the Nakuru District during November 1923 the Agricultural and Horticultural Society was reluctantly compelled to postpone their Annual Show until the outbreak had subsided, as a consequence no Show was held during the year under review.

NATIVE AGRICULTURAL SHOWS.

One of these Shows held in conjunction with the Administration in the Kikuyu Native Reserve was very successful, and justified further arrangements for the holding of similar Shows in various other Native Reserves in the early part of 1924.

EAST AFRICAN STUD BOOK.

The second volume of the East African Stud Book was published and circulated during the year.

LIVESTOCK.

No outstanding change in the state of the Livestock industry has taken place during the year and the position outlined in the Annual Report of this Department for the year 1921 to all intents and purposes still obtains. The following compara-

tive table shews the numbers of stock possessed by Europeans:—

Livestock.	1920.	1921.	1922.	1923.
Cattle—Total	137,604	161,210	172,397	190,140
(a) Breeding Stock	77,042	92,298	97,260	104,631
(b) Oxen	60,562	68,912	74,137	85,509
Horses	1,269	1,311	1,351	1,454
Mules	996	976	1,257	1,093
Donkeys	902	1,108	1,512	1,260
Sheep (Wool-bearing)	89,454	98,168	109,748	112,046
Sheep (Native)	11,802	16,136	24,137	35,014
Goats	2,654	4,323	5,130	6,258
Pigs	9,450	15,038	16,121	12,120
Poultry	29,354	33,772	34,371	38,685

The increase in the number of European-owned cattle was 10.29 per cent. as compared with 6.94 per cent. in 1922.

The increase in Wool-bearing Sheep as compared with the previous year is 2.09 per cent. and that for Native type 45.06 per cent. or a total increase in Sheep of 9.84 per cent. The number of goats in the possession of Europeans increased by 23.94 per cent.

Attention to the export trade in dairy products is being well sustained and various firms are now rendering valuable service to the Colony by pioneering this export trade and in establishing markets overseas. During the year under review the quantity of Butter which left our Shores shewed an increase of 197 per cent. over that exported during 1922, while the export of Cheese increased by 98 per cent. Bacon and Hams unfortunately do not shew the results which might be hoped for. During the year the export values of these commodities dropped by 40 per cent. This decrease may be attributed to the fall of prices on the European markets. This can be substantiated by the fact that in 1921—22 an export of 880 cwts. realised £8,058 whereas 827 cwts. exported in 1922—23 realised £4,672 only, the average value having dropped during that period from 183 shillings to 113 shillings per cwt. representing a fall in value of 38 per cent.

The large numbers of cattle in the hands of Europeans can give a return through Dairying and the Export of Meat. The former is more feasible as the cost of equipment is low compared with the cost of equipping a plant and establishing a Meat Pro-

ducts Export. However, in conjunction with the surplus of cattle from Native areas in Kenya and adjoining territories which should annually reach a total of at least 50,000 head ; there appears to be an adequate reservoir for supply to a Meat Products works.

Cold Storage equipment at the Coast of a size which will give an economical capacity is a crying need for this country's live stock development. At first it would be used chiefly for Butter, Bacon and Cheese Export products, as also for meat for nearby markets.

Woolled Sheep should increase in numbers rapidly and farmers are recommended to explore the possibilities of sheep farming as no doubt it is attractive.

The movement of Native trade cattle mentioned in the last report will become greater as the Veterinary supervisory measures taken and continued in one large Native reserve approach completion. Free trade and movement of immune cattle from one large breeding area to other areas is aimed at, the area being extended as the Staff becomes available.

Livestock Importations. During the year 37 Purebred Cattle, 86 Purebred Sheep and 13 Racehorses were imported by private owners principally from Europe, South Africa and Australia.

MAIN CROPS.

The total area under crops as at 30th June, 1923, was 247,189 acres, for comparative purposes the previous year's areas are also indicated.

CROP.	1923 acres.	1922. acres	Increase per cent.	Decrease per cent
Maize	99,764	75,444	32	—
Wheat	15,429	13,696	13	—
Barley	818	932	—	12
Coffee	52,249	43,359	20	—
Sisal	39,026	37,118	5	—
Flax	5,889	10,209	—	42
Coconuts	8,818	9,378	—	6
Sugar	4,193	3,787	11	—
Miscellaneous Crops	21,003	20,786	1	—
	247,189	214,709		
Less Catch Crops	8,427	8,812		
TOTAL	238,762	205,897	16	

COFFEE.

Sustained activity was manifest amongst Coffee Planters, an area of 8,890 acres being planted during the year bringing the total area under Coffee up to 52,249 acres. Of this some 26,777 acres is in bearing.

The production of coffee in 1923 exceeded anticipations at 122,885 cwts. attributable to the excellent season. The amount of capital invested in the industry and the very great contribution which the Coffee industry makes to the wealth of this Colony warrants the Government taking the greatest care of the industry and guarding it in every possible way. Inspection of Plantations must be carried out fully and efficiently each year and new methods of handling the trees, and the picked berry tried and introduced.

One Coffee Officer cannot adequately deal with all the points which arise. Coffee is grown in Kenya under such a diversity of conditions that a very thorough knowledge of the crop is necessary if planters are to succeed. Each district presents different problems and guidance, however slight, is always appreciated. The manuring of Coffee on old established Estates should become routine. The soil on which Coffee is planted is almost invariably rich but the excessive insolation and washing to which it is subjected, the generally scrupulous cleanliness of the plantations and the continuous cultivation cannot fail rapidly and materially to reduce the Humus content of the soil. This causes die-back, easy drying out so that the effects of drought are accentuated, and generally results in reduced crops. Organic manures containing or fortified by the addition of phosphate will undoubtedly have a great effect on old coffee. Lime too in which African soils are generally deficient should be tried.

The Coffee Officer in the course of his duties covered 5,200 miles by car and inspected 255 Coffee plantations: only about half the number of plantations existing were visited. 452 interviews were given in the Nairobi Office and in addition numerous letters of advice were sent out.

The subject of shading evokes much interest and planters are taking steps in various places to try its effect on their coffee. Very encouraging results have been secured.

Diseases and Pests. From time to time pests appear, multiply rapidly, cause a certain amount of temporary damage

and then disappear. In view of the fact that most pests and diseases may be controlled by spraying, adequate provision for a water service in plantations should be made. It is reported that the incidence of pests and diseases is greater, two new diseases, "Pink Disease" and "Coffee Berry Disease" were noted, and investigations commenced.

Thirty-four plantations were found in a dirty, unhealthy neglected state and notice to clean was given where considered necessary.

In many directions improvement in methods of management and in quality of product have been noticed. The report of the Coffee Officer attached hereto should be referred to.

FLAX.

The acreage under this crop continues to exhibit a smaller figure, the acreage *harvested* during the past four years was as follows :—

1920	..	9,297	acres.
1921	..	26,475	"
1922	..	14,587	"
1923	..	11,781	"

The growing of Flax is now restricted to those areas in which it has a better chance of doing well, and with a rise in prices we may look for some increase in the acreage planted.

Grading, which was never abolished and has shewn steady improvement in operation, is now carried out by one Government Officer so that an adjustment of policy has occurred from 1922. At the same time charges have been heavily reduced to 30/- per ton for Flax fibre and 10/- per ton for tow. These low charges should result in all flax produced in Kenya being Government graded. However, if grading is to continue the present heavy expenditure incurred by the Flax Officer on travelling should be reduced. A proposal to centralise grading and baling for export at Nakuru should be very seriously considered as the Grader could then grade at least three times as much Flax as is possible under the present system of Factory grading, admitting of the present low charges for grading. An awkward situation will have to be met when our only Flax Officer proceeds on leave.

In addition to grading the Flax Officer renders advisory services, and conducts useful experimental work in the various

areas, the value of which may be judged from a perusal of that Officer's report.

MAIZE.

The area under cultivation by Europeans was 75,444 acres at June 30th, 1922, and one year later was 99,764. For 1924, 120,000 acres are expected to be planted. The cultivation of this crop is advancing by leaps and bounds and within a very few years the production of Maize will be very great, and will be firmly established. The problems of handling this somewhat bulky crop as they arise will be dealt with and the adoption of elevator systems and methods should go towards meeting the inevitable drop in maize values which we shall experience.

At the instance of the Director of Agriculture, a Maize Conference was held in the Department's Offices at which all interested parties were represented. As a result of the Conference the Government adopted a proposed scheme for the compulsory Grading of Maize. The proceedings have been published. At first the official moisture content has been fixed at 14% but a revision downwards of this figure in 1924 is contemplated which should bring Kenya into line with other Maize exporting countries.

A Drying and Cleaning Plant for the "Hospital Treatment" of Maize out of condition or otherwise rejected is an essential, however, before very high standards may be demanded from our Native and European growers. The erection of such a plant is contemplated in the near future.

As the cost of bags and of railage to Mombasa ranges from 20% to 30% of the value of the Maize in Kenya it will be realised how important it is that charges such as these should be kept as low as possible.

The quality of Kenya White No. 2 is very good although the description is somewhat wide. Kenya within its own borders possesses material very acceptable to the London market yet susceptible by selection of a large improvement in regard to yield per acre and uniformity of type and size of grain.

SISAL.

At June 30th, 1923, there were 29,026 acres, an increase of 1,908 acres for the year. The production for 1922/23 was

138,240 cwt. and for 1923/24 the estimate is 232,100 cwt. Sisal production in Kenya is now on a thoroughly sound basis and the crop lends itself better than most others to the meeting of a large demand in that some excess cutting and scutching may be carried out.

WHEAT.

The areas harvested during the last four years are as follows, shewing an excellent advance in acreage:—

1919/20	..	5,614	acres.
1920/21	..	4,999	„
1921/22	..	10,592	„
1922/23	..	15,138	„

It is anticipated that Wheat will become an important product in Kenya. The deterrent factors to-day are the lowness of yield and the incidence of rust. Both these factors admit of control and some control is now possible. A bag of Wheat is normally worth one and a half to two times as much as a bag of Maize and if, as is feasible, yields could be raised to 24 bushels per acre the cost of production per bag would be little higher than that of Maize. This figure may be reached within a few years and it is expected that then a large acreage of Wheat will be grown.

Practically all the Plant Breeder's time has been spent on selecting Wheats. Some very fine strains have been isolated, a few of which will soon be undergoing their practical farm trial on scale prior to general distribution. The problem in Kenya is twofold, we have (i) to find strains suitable for blending so that local milling is feasible; and (ii) a high yielding commercial export type for excess production.

425 cultures were planted out in triplicate for comparative yield trials and rust resistance.

70 pure lines of "Droop" Wheat were sown for multiplication.

Certain crosses were made.

At Njoro further work on selection and multiplication for issue has been carried out.

*Comparative yields per acre of Wheat in certain Districts
over a period of 4 years.*

District.	1922—23		1921—22		1920—21		1919—20	
	Bags per acre.		Bags per acre.		Bags per acre.		Bags per acre.	
Lumbwa ..	2.44	..	1.80	..	2.55	..	2.35	
Machakos ..	1.63	..	0.73	..	2.16	..	3.05	
Naivasha ..	3.42	..	1.81	..	2.19	..	4.50	
Nakuru ..	2.47	..	2.59	..	2.51	..	1.02	
Trans-Nzoia ..	2.78	..	2.76	..	2.73	..	1.98	
Uasin Gishu ..	2.30	..	3.15	..	2.87	..	2.57	

OTHER GRAIN AND PULSE CORPS Etc.

Barley. Some very high yields have been reported and good samples submitted. The Colony has not yet produced a bulk sample of uniform Malting Barley for a thorough brewing trial. This should be done.

Peas and Beans. Some interest is taken in these grains, but until the farming system of the country takes proper shape not much attention will be bestowed on such crops by farmers. The Drying and Cleaning Plant projected will, however, serve to assist the export of these pulses.

Buckwheat has been grown on a small scale, it should be considered as a cover crop in Orchards and Plantations.

Tea growing received further attention and from time to time enquiries are made. The Department is not in a position to assist enquirers as yet as no member of the staff has had the experience which would enable him to advise.

There are other crops such as Sunflowers, Rape, Potatoes, Lucerne, Oats, Sugar Beet, Onions, Chillies, Cotton, Castor and many besides which are being tried out all over the country. Enthusiastic settlers in most areas can be relied on to try on a small scale several new things each year to the ultimate advantage of the country.

Sugar Cane. The area under cane is increasing. The large local market in being and (with a reduction in the cost of sugar) the potential huge market, making it most probable that a large output will be achieved in the future. The cost of sugar production when large mills are well established should

below, and a reduction in the price of the commodity will no doubt give rise to other agricultural industries.

Coconuts. A Committee of Legislative Council revised the legislation in force and a new Ordinance was introduced during the year. There has been a decrease in the acreage under Palms.

HORTICULTURE.

Farmers continue to plant small Fruit gardens but no extensive planting has taken place. This is a section of work which must feel its way until the suitability of the different areas for the various fruits is determined.

WATTLE.

Interest has been awakened in this tannin producing crop and concurrently with a rise in values for Bark overseas, an extract factory was established. The area suitable for the growth of wattle on a sound commercial scale is limited but none the less valuable.

“NATIVE” AGRICULTURE.

(a) CROPS.

No attempt has been made to gauge the amount of “Native” production, it being realised that the figures are estimates and on the whole inaccurate.

However, the surplus from Native Reserves can be estimated from the consignments of native produce on the Uganda Railway and from the fact that many crops are raised solely by native cultivators.

From an examination of Agricultural Exports and a knowledge of the consignments from various stations on the Uganda Railway and Marine it is estimated that native produce was responsible for £261,000 out of a total export of £1,325,440 in 1923.

Natives if encouraged to work and produce in their reserves will learn much, particularly the value and dignity of labour. As they prosper their dietary should become more varied and their lives lengthened. Improvement in the quality and physique of the future generations of natives should be manifest.

The following is a list of seed issued during 1923, for use in Native Reserves:—

Maize	..	131,500 lbs.
Beans	..	35,000 ..
Simsim	..	3,600 ..
Groundnuts	..	1,200 ..
Cotton	..	168,000 ..
Rice	..	1,020 ..

In addition 6 tons of Rice obtained from an original departmental issue were distributed by the District Commissioner, Lamu. The total issue was sufficient to plant 25,000 acres.

One hundred purebred Rhode Island Red Cockerels were distributed.

The Maize seed in the hands of Natives is poor and attenuated, the seed issues should give an impetus to the growth of this important cereal.

Cotton has been encouraged chiefly in North and Central Kavirondo where there are four Ginneries established, two in process of erection and one projected. One is projected for Southern Kavirondo. Some 6,000 acres of Cotton is estimated to mature from the 1923 sowings.

A Cotton tax of six shilling cents per lb. of lint was imposed on all cotton produced in 1923. When it is considered that certain of the work in cotton ordinarily performed by the cultivator is carried out by the Government and that for similar work with European crops a charge would be made, the alleged injustice of the tax is less apparent.

(b) LIVESTOCK.

Losses among native livestock caused by disease were on the whole not greater than in former years in the reserves. The large and increasing demand for native work oxen in the non-native areas has resulted in an all round increase in prices and in order to facilitate the trade extra quarantine stations have been established to permit of the safe movement of cattle from the disease-infected reserves. The trade in hides and goat-skins continues to show an upward trend and efforts are being directed towards increasing the value of these commodities by instructing the natives in better methods of preparing them for the market. Ghee production continues to receive attention and efforts are being made to improve the quality of this product.

(c) GENERAL.

The work amongst native tribes commenced a few years ago is already attaining some proportions and in conjunction with Administrative Officers the Officers of this Department will find in how many and diverse ways they are able to help the native peoples to greater prosperity. I would, however, prefer to see at first concentration of work on a few tried crops which promise success, so that the ground work having been done the Department may find it easier in the future to introduce to the native what must be to him innovations.

LABOUR SUPPLY.

The average number of units of native labour employed monthly on European holdings during the last four years is:—

1920	..	..	53,709.
1921	..	..	67,388.
1922	..	..	61,949.
1923	..	..	70,957.

The increasing demand for labour is to be noted and is an index of the work and development carried out by European farmers. Their requirements will increase each year as more land comes under the plough and permanent crops advance to

maturity. This avenue of employment is one contribution to the prosperity of our native population and one of great value to the labourer.

VETERINARY.

The following statement shows the number of outbreaks which occurred in the "settled" areas of the three most serious diseases over a period of three years:—

	1921 (9 months).	1922	1923.
Rinderpest.			
Number of farms infected.	29	14	38
Pleuro-pneumonia.			
Number of outbreaks.	34	7	4
East Coast Fever.			
Number of outbreaks in "clean" areas.	6	12	6

RINDERPEST.

Although the number of outbreaks of this disease which occurred on European-owned farms shows a marked increase over last year's figures, the total losses cannot be considered as heavy since it is estimated that they did not exceed 350 head. In the North and Central Kavirondo districts the efforts of the Veterinary staff to control the spread of the disease by the adoption of quarantine measures were markedly successful but the mortality in infected herds was 24.6%.

The following comparative table shows the numbers of cattle which have been "double-inoculated" during the last three years:—

	1921. (9 months).	1922.	1923.
On European Farms.	13,231	6,847	15,523
In Native Reserves.	—	18,984	7,935
At Quarantine Stations.	13,974	6,283	5,126
Total.	27,205	32,114	28,584

PLEURO-PNEUMONIA.

While the position in the "settled" areas shows marked improvement the same cannot be said of the native reserves. The Northern Frontier Province, the Suk District, the native reserves of the Nyanza Province and the Masai Reserve are all infected with this disease and, with the existing Veterinary Staff, it has only been possible to adopt active control measures in the Northern and Central Kavirondo districts of the Nyanza Province and in the Samburu District, Northern Frontier Province. The measures adopted in these areas consist in isolating all infected animals and in vaccinating the in-contact cattle.

EAST COAST FEVER.

Six outbreaks of East Coast fever occurred in the "clean" areas during the year and six old outbreaks were suppressed by systematic dipping and "hand-dressing". The losses reported from this disease, particularly in the Uasin Gishu and Nakuru districts, were extremely heavy and these are attributed, in most cases, to the exceptionally heavy rains which resulted in flood water gaining access to the tanks, thus rendering the dipping fluid ineffective. It is feared that little headway can be made towards eradicating East Coast fever in the infected European areas until either cattle dipping is made compulsory or all stock farms are fenced.

Many stock farmers who are dipping their cattle do not appear to exercise sufficient care in adjusting the strength of the dipping fluid. The percentage of dip-samples which was classed by the Chemical Research Department as "dangerously wrong", that is, the error in strength exceeded 20% above or below the standard strength, was 27.8 in 1921, 31.71 in 1922, and 32.16 in 1923.

FOOT & MOUTH DISEASE.

Foot and Mouth disease became widespread in many districts during the year, but the losses suffered were, in most cases, negligible. This disease may be regarded as enzootic in most of our native reserves and, in view of its mild nature in this country and of the impossibility of controlling its spread with the machinery at the disposal of the Veterinary authorities, it is considered doubtful if the restrictions which are imposed at present, and which cause considerable losses and inconvenience, are justifiable.

OTHER DISEASES.

It is hoped that the action which has been taken in the Thika district to prohibit the movement of cattle from a defined area, including the Ithanga Hills where tsetse flies are known to exist, will be effective in preventing further outbreaks of trypanosomiasis on the farms lying outside the "fly belt".

Twenty-seven outbreaks of Anthrax came under notice during the year resulting in 62 deaths.

Two farms are now infected with tuberculosis, the total number of cattle involved being slightly over 500 head. Cattle which react to the tuberculin test are forwarded to the Veterinary Laboratory for slaughter, in order to permit of a careful post-mortem examination being made and it is hoped that in course of time the disease will be eradicated.

Twenty-six outbreaks of blackquarter with 156 deaths were reported and "three day sickness" was prevalent in certain districts during the year.

The number of cases of Ulcerative Lymphangitis reported this year was seventy-seven as against one hundred and thirty in 1922 and, of epizootic lymphangitis, sixteen as against thirty-two.

Horse-sickness was responsible for a heavy mortality in the North and West Kenya districts where one hundred and six deaths occurred out of a total of one hundred and sixty-nine recorded.

Diseases affecting sheep are now receiving more attention than formerly owing to the high price obtaining for wool.

Only one outbreak of East African Swine Fever came under notice during the year.

Increased crop production has led to a considerably increased demand for work oxen particularly for oxen drawn from areas where East Coast fever is considered to be enzootic, and arrangements are being made to open new quarantine stations on the borders of certain native reserves in order to provide facilities for this demand to be met.

DIVISION OF VETERINARY RESEARCH.

The report of the Acting Chief Veterinary Research Officer should be read by those who are interested in the welfare of our livestock.

One post of Veterinary Research Officer remained unfilled during the year.

Officers of the staff of the Veterinary Research Laboratory travelled considerable distances in connection with disease investigations.

The Laboratory plant was kept in good order during the year but properly to function the institution requires a refrigerator and a large incubator room. Owing to the many vaccines now being produced some extensions and re-organisation to guarantee the purity of the products are inevitable and from time to time additional rooms, buildings and equipment are essential.

The water supply is still inadequate and uncertain.

An enormous increase in routine work over 1922 is reported, there being over twice as many specimens submitted for diagnosis.

Investigational work continued with a staff shorthanded on account of the absence on leave of the Chief Veterinary Research Officer and of Research Officer Whitworth.

Cattle:—(1) Contagious Pleuro-pneumonia. Testing for.
Vaccination against.

(2) Rinderpest.

(3) Redwater and Anaplasmosis.

(4) Infectious Abortion.

Horses:—A statement regarding horse-sickness will prove of interest as indicating a mild manifestation of a disease similar, if not identical with Horse-sickness. Sheep-Diseases of these animals are of great interest in that it is known that there are some large areas in Kenya over which wool-bearing sheep may be run. Time has been spent on the preliminary investigation of a few diseases.

ENTOMOLOGY.

TRAVELLING.

3,992 miles were travelled by the Entomologist on duty. The subjects of investigation were:—

A Fly survey of the Ithanga and Kakuzi Hills and the fixing of a quarantine line; inspection of coffee plantations and nurseries in conjunction with the epidemic of Green Scale; inspections at the Coast, at the request of the Director of Education; inspection at the Port in connection with the Export of Maize; to enquire into the reported presence of Tsetse Fly on the Nzoia and Noigamaget Rivers; to address meetings of coffee planters in various districts.

SERICULTURE.

A further report has been received from the Imperial Institute. The cocoons are described as clean, well-shaped and of good appearance. The actual quality of the silk could not, however, be definitely determined, except by carrying out practical trials, and though the quantity of cocoons available was insufficient for weaving tests, a preliminary reeling trial was carried out at a filature in Lyons. The yield of silk was found to be satisfactory, but the product though rather coarse, was found to be of good tenacity but only moderately satisfactory as regards elasticity. The silk was valued at Shgs. 31/- per lb. in the United Kingdom (March 1923).

ROUTINE WORK.

Consignments of plants and seeds have been examined on importation; seeds and plants for export have been examined; applications for permits to import plants and seeds have been scrutinized, passed, or amended; specimens of insects, damaged plants, seeds, etc., have been reported on; the collections have been added to and the Entomological Record kept up to date.

DEVELOPMENT AND IMPROVEMENT.

The Entomological Laboratory and fittings have been removed from Kabete to the Scott Agricultural Laboratories. Two acres of Mulberries have been planted for further experiments in Sericulture.

INSECT PESTS OF THE YEAR.

Green Scale and Mealybug on Coffee have appeared in epidemic form and have been responsible for considerable loss.

MYCOLOGY.

The absence of the Mycologist on leave necessitated a curtailment of mycological work during several months of the year. Part of this leave however was spent in visits to Ireland to study research methods in water retting of flax and to South Africa where a variety of mycological problems was discussed with officials there.

During the rest of the year the Coffee Berry Disease investigations were continued and considerable progress was made. Work was also done on a new disease of beans. A disease of Kaffir corn of possible importance to native agriculture also received attention.

Five diseases of economic importance were reported for the first time, of which Pink Disease of Coffee was the chief. An article on this was prepared for the local press.

During tours to various parts of the country 52 farms were visited and four meetings of settlers were held at which some 130 people were addressed on the diseases of chief importance to them.

PLANT IMPORTATION & CROP EXPORT.

The work in connection with the importation of Plants and Seeds has been combined with the inspection and grading of export produce. This work is carried out at the Port of Mombasa and Kilindini. An additional Grader and Inspector, and a Junior Clerk, were appointed in 1923.

The Inspector, Mr. Sharp, who is in charge of this work visited Durban in order to secure first hand knowledge of the methods and organisation used there in the Grading of Maize.

IMPORTS.

During the year 1340 packages of plant imports were inspected at Kilindini, their value was Shgs. 77,799/07; of these importations four packages were destroyed on account of infection by disease and seven packages were destroyed as being prohibited imports.

EXPORTS.

During the first nine months of the year samples of Maize were taken, examined and analysed for moisture content to secure information of value for the Maize Conference and when grading should be established. The nature of this information may be judged from a perusal of the Inspector's Report.

A total of nearly 500,000 bags of Maize was shipped in 1923, of which 97,000 were inspected, and in addition in the last two months of the year when grading was in force 82,000 were inspected and graded.

Inspection work in connection with Beans, Cotton seed and Potatoes was also carried out.

PUBLICATIONS.

The following bulletins, articles, etc., prepared by the Officers of the Department have been published during the period under review:—

Agricultural Census of the Colony and Protectorate of Kenya for 1923—4th Annual Report.

Agricultural Census of the Colony and Protectorate of Kenya for 1922—3rd Annual Report.

Meteorological Records, 1921. Meteorological Bulletin No. 7—13th Report.

Report of Proceedings of Maize Conference held at Nairobi, 1923.

Grading of Maize Rules (1923).

The Bionomics of the White Coffee-leaf miner, *Leucoptera coffeella*, Guer., in Kenya Colony; by H. E. Box, F.E.S., (Bulletin of Entomological Research, Vol. XIV, Part II, October 1923).

Notes on Castor Seed.

Preparation of Bordeaux Mixture Spray.

Mafundisho kwa kupanda na kuuza Pamba (Instructions for growing and selling Cotton). Swahili Leaflet No. 1.

Notes on Chillies.

Notes on Sim-sim.

Notes on Ground Nuts.

Kenya Cotton Ordinance, 1923—Rules.

Insect pests of Coffee, by T. J. Anderson, M.A., B.Sc., F.E.S., F.Z.S., Chief, Division of Entomology.

DEPARTMENTAL REPORTS, &c.,

Submitted with this report are included the following appendices :—

- (a) Staff as at December 31st, 1923.
 - (b) Annual Report of the Chief Veterinary Officer.
 - (c) Annual Report of the Chief Veterinary Research Officer.
 - (d) Annual Report of the Entomologist.
 - (e) Annual Report of the Mycologist.
 - (f) Annual Report of the Plant Breeder.
 - (g) Annual Report of the Senior Coffee Officer.
 - (h) Annual Report of the Flax Officer.
 - (i) Annual Report of the Senior Agricultural Supervisor,
Kisumu.
 - (j) Annual Report of the Agricultural Supervisor, Henry
Scott Agricultural Laboratories.
 - (k) Annual Report of the Grader and Inspector, Mombasa.
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PERSONAL.

The staff of the Department, although reduced and below establishment, has overtaken the work without serious delay, particularly in the Head Office. Their keenness and devotion are much appreciated.

Whilst on leave various Officers spent considerable portions of their time in becoming acquainted with various processes and markets oversea to the advantage of the Department.

E. HARRISON,
Ag. Director of Agriculture.

APPENDIX "A".

STAFF LIST

OF

DEPARTMENT OF AGRICULTURE.

(AS AT DECEMBER 31st, 1923).

Director:

Alex Holm, F.H.A.S., M.R.A.S.E., S.E.A.C., (Dip Hons).

Deputy Director:

E. Harrison, M.S.A., B.Sc., N.D.A. (Hons).

Administrative and General.

Statistical Officer: L. D. Carpenter, P.A.S.I.

Accountant:—H. S. Land.

Office Superintendent & Asst. Accountant:—A. C. Hunter.

Clerks:—R. Abram, J. L. Byrne, M.C., R. F. Dalzell-Armstrong, J. E. Harrison, R. A. Hawkins, F. Parker, L. Myers.

Junior Clerks:—S. W. Austin, F. W. Evans, F. E. K. Barrett (Miss), B. J. Ratcliffe, K. Rhys Maitland, F. Rhys Maitland, E. V. Stobbs.

Lady Typist:—Miss M. A. Duncan.

Entomologist:—T. J. Anderson, M.A., B.Sc., (Hons. Edin.), F.Z.S., F.E.S.

Mycologist:—J. McDonald, D.F.C., B.Sc., (Hons).

Plant Breeder:—G. J. L. Burton, M.C., B.A.

Senior Coffee Officer:—A. D. le Poer Trench (Dip. O.A.C.)

Flax Officer:—G. M. Hamilton.

Graders and Inspectors:—C. C. T. Sharp, A. R. Teague.

Senior Agricultural Supervisors:—P. Booth, N.D.A.

Agricultural Supervisors:—F. B. L. Butler, F.L.S., T. M. W. Sheppard, B. H. Frowd, H. Boedeker, A. S. Hartley.

VETERINARY.

1. ADMINISTRATIVE & EXECUTIVE DIVISION.

Chief Veterinary Officer:—W. Kennedy, D.S.O., M.R.C.V.S.

Deputy Chief Veterinary Officer:—A. G. Doherty, M.C.,
M.R.C.V.S.

Senior Veterinary Officers:—H. H. Brassey Edwards,
M.R.C.V.S.; O. Dixon, M.C., M.R.C.V.S.; R. C.
Wheeler, M.B.E., M.R.C.V.S.

Veterinary Officers:—A. W. Carter, M.R.C.V.S.; M. H.
Reid, M.R.C.V.S.; G. B. Purvis, M.R.C.V.S.;
R. S. Little, M.R.C.V.S., D.V.S.M.; R. L. Creery,
M.R.C.V.S.; W. G. Emerson, M.R.C.V.S.; E. J.
Mulligan, M.R.C.V.S.;

Stock Inspectors:—H. G. Ulyate, D. Wyartt, R. A. C.
Campbell, W. L. Lewis, G. White, H. E. Evans,
J. Mackay, L. E. Smith, F. G. Chapman, H. Thorne,
S. F. Saunders, G. Bussey, T. Harris, F. T. O'Meagher,
J. T. Morgan, J. F. Greig, A. E. Hudson, J. E.
McDonogh.

2. DIVISION OF VETERINARY RESEARCH.

Chief Veterinary Research Officer:—J. Walker, M.R.C.V.S.

Assistant Chief Veterinary Research Officer:—W. Kearney,
M.R.C.V.S.

Research Officers:—J. T. C. Bradshaw, M.R.C.V.S., S. H.
Whitworth, M.R.C.V.S., B.V.S. (Melb.)

Laboratory Superintendent:—A. Walker.

Laboratory Assistants:—J. T. Schultz, J. Ford, H. J. Gray,
P. H. Poolman, J. R. McQueen, J. S. McDonald.

Overseer:—J. Burton.

Yard Foreman:—J. Forsyth.

Clerks:—W. White, A. E. Johnstone, A. J. Kemp.

Mechanic:—O. Stenmark.

Storekeeper:—J. Scott.

Assistant Storekeeper:—G. W. Clochley.

Junior Clerk:—Miss N. Judd.

APPENDIX "B".

VETERINARY DEPARTMENT.

ANNUAL REPORT

OF

THE CHIEF VETERINARY OFFICER

FOR

THE YEAR ENDING 31ST DECEMBER, 1923.

STAFF CHANGES.

Captain W. E. Phipps, Veterinary Officer, resigned from the Service with effect from 20th August, 1923, and Mr. E. E. Bladen Taylor, Stock Inspector, resigned with effect from 29th December, 1923.

The following additional Stock Inspectors were employed for the periods shown for special duty in the Meru Native Reserve:—

Mr. H. J. Vernon,		24.1.23 to 31.12.23.
Mr. C. B. Jolley,		24.1.23 to 31.12.23.
Mr. T. Lloyd,		24.1.23 to 31. 5.23.
Mr. W. N. Cole-Currie,		30.1.23 to 30.11.23.
Mr. P. J. Battelle,		1.6.23 to 30.11.23.

Mr. H. H. Brassey Edwards was appointed Acting Deputy Chief Veterinary Officer on the 24.10.23, when Lieut. Colonel A. G. Doherty, Deputy Chief Veterinary Officer, proceeded on leave.

DISEASES OF CATTLE.

GENERAL.

The Fifth Pan-African Veterinary Conference was held at Nairobi in April, 1923, and was attended by representatives from the Union of South Africa, Madagascar, the Sudan, Portuguese East Africa, Nyasaland, Tanganyika Territory, Uganda and Kenya. A lengthy Agenda was fully discussed and the benefits derived from the consequent interchange of information and views cannot be overestimated. The report of the proceedings of the Conference is now in the hands of the Printer and it is hoped that it will be found possible to publish it in the near future.

It is regretted that the Veterinary operations against Rinderpest and pleuro-pneumonia in the Lumbwa Native Reserve, which were referred to in the report of last year, had to be abandoned chiefly in view of the objections raised by the natives to the payment of inoculation fees. The staff which had been employed in the Lumbwa Reserve was detailed in April to carry out a veterinary survey in North, Central and South Kavirondo and by the end of June this survey had progressed so far as to make it obvious that rinderpest and pleuro-pneumonia could best be tackled by concentrating the available staff in North and Central Kavirondo. Operations were, therefore, begun in these districts in July and they have so far proved markedly successful.

Owing to the rapid spread of pleuro-pneumonia amongst the cattle of the Samburu tribe, Northern Frontier District, it was decided in October to transfer a portion of the staff operating in Kavirondo to Samburu with a view to preventing further losses there, as far as possible, by vaccinating all cattle which have not yet contracted infection.

This depletion of the staff in Kavirondo has naturally resulted in "slowing down" the veterinary operations there, but this is not very marked owing to the fact that it has been possible, during the past six months, to engage and train a large number of natives who are now doing excellent work in detecting outbreaks of disease, supervising quarantined areas and instructing the natives in better methods of ghee production and of preparing hides and skins.

The success of the operations in Kavirondo is largely due to the assistance which has been given to the staff by the Officers of the Administration coupled with the active co-operation of the various Chiefs and Headmen.

Increased crop production on European-owned farms during the year led to a considerable demand for work oxen from the native reserves and, in order to provide facilities for the purchase

of the required cattle, the quarantine station at Kibigori was re-opened in May and arrangements are now being made to open other quarantine stations in the Trans-Nzoia and Nandi districts. The Laboratory serum test for pleuro-pneumonia has proved to be most effective in detecting infected cattle at the Kibigori Quarantine Station.

RINDERPEST.

With the exception of the Northern portion of the North Kavirondo District rinderpest was prevalent, during the period under review, throughout the native reserves of the Nyanza Province. Considerable headway was made by the Veterinary staff in controlling the outbreaks in North and Central Kavirondo, but the losses from the disease throughout the Province were very heavy. In North and Central Kavirondo 23,560 cattle were involved in the various outbreaks which occurred and the losses amounted to 5,800, that is, 24.6%.

The Elgeyo Reserve in the Ravine district became infected early in the year, presumably through the illicit movement of cattle from the native reserves of the Nyanza Province, and infection spread from these centres to European farms in the vicinity, that is, in the Kisumu-Londiani, Trans-Nzoia and Uasin Gishu districts.

Rinderpest has been prevalent in the Masai Reserve for several years and, this year, infection spread from there to the Southern Kikuyu Reserve which is contiguous and, as a result of the movement of "squatters'" cattle from the latter Reserve to the European-owned farms in the Kiambu-Nairobi districts, several outbreaks occurred. Outbreaks also occurred on farms in the Machakos district and, in these cases, infection was traceable to extensions of the disease from the Machakos Native reserve.

The following is a summary of the outbreaks which occurred on European-owned farms during the year:—

1. Uasin Gishu—Trans-Nzoia districts	17
2. Kisumu—Londiani district	11
3. Nairobi, Kiambu and Machakos districts	9
4. Laikipia district	1

Total	38
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Of the total of 38 outbreaks—31 were suppressed and 7 farms remained in quarantine at the end of the year. Most of the outbreaks referred to were dealt with by the use of anti-rinderpest serum and the total losses are estimated to have been about 350 head. Fifteen thousand five hundred and twenty-three head of cattle were immunized against rinderpest in the "settled" areas by the simultaneous injection of virulent blood and anti-rinderpest serum.

In the Masai Reserve three thousand three hundred and sixty-five Government-owned cattle were inoculated against rinderpest in the Mara district and only calves six months old and under proved to be susceptible; four thousand five hundred and seventy head of Uasin Gishu Masai cattle were also inoculated there and only ten deaths resulted.

Five thousand one hundred and twenty six cattle were inoculated against rinderpest in the various quarantine stations bringing the total number of cattle double inoculated during the year up to 28,584 head.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.

In the European areas the position with regard to pleuro-pneumonia continued to improve as only four outbreaks occurred during the period under review. These outbreaks occurred on farms situated in the Laikipia, Kisumu-Londiani, Kericho and Uasin Gishu districts respectively and as they were promptly dealt with the mortality was negligible. At the end of the year three farms remained in quarantine for this disease.

While the position in the "settled" areas shows marked improvement the same cannot be said of the position in the native reserves. The Northern Frontier District, Suk District, the native Reserves of the Nyanza Province and the Masai Reserve are infected with this disease and as Veterinary staffs are only operating in a portion of the Nyanza Province and in the Samburu area of the Northern Frontier District, the position in the other infected areas is most unsatisfactory.

The outbreak mentioned in the report of last year as having occurred in the Meru native reserve through extension of the disease from the Northern Frontier District was effectively dealt with by quarantine measures and vaccinations carried out on a large scale. A special staff of four Stock Inspectors, working under the supervision of the District Veterinary Officer, was employed to deal with this outbreak and altogether upwards of 82,000 head of cattle were treated. As no further cases came to notice the quarantine imposed on this area was raised in November.

When the Veterinary survey, referred to under the heading of Rinderpest, was carried out in the Nyanza Province, pleuro-pneumonia was found to be widespread in Central Kavirondo district and in the southern portion of North Kavirondo district. The quarantine measures adopted there have proved very successful in controlling the further spread of the disease and this success is largely due to the assistance rendered by the Chiefs and Headmen. Over thirteen thousand cattle were involved in the various outbreaks which came under notice and the losses recorded over a period of four months amounted to 670 head, that is, about 5%. After all the outbreaks had been located

and the visibly affected cattle had been segregated the owners were encouraged to slaughter the infected beasts for food and to have their in-contact cattle vaccinated against the disease: vaccinations on a large scale are now being carried out in Central Kavirondo. Trade cattle drawn from the infected areas are dealt with at Kibigori Quarantine Station where the Laboratory serum test, previously referred to, is applied. During the seven months that this quarantine station was open 1,040 cattle underwent the immunity test, four hundred and twenty two of these successfully passed the test and the majority of the remaining cattle were rejected as reactors; of the reactors 126 were slaughtered for food and all of them proved to be infected on post-mortem examination.

EAST COAST FEVER.

Six outbreaks of East Coast fever occurred in the following "clean" areas during the year:—Limoru (one outbreak), Nakuru (one outbreak), Upper Molo (two outbreaks), North Kenya (one outbreak), and Laikipia (one outbreak). The disease was successfully eradicated by dipping on six farms situated in the "clean" areas, where outbreaks occurred last year.

The losses reported from this disease in the Uasin Gishu, Trans-Nzoia, Nakuru and Ravine districts—all infected areas—were extremely heavy and would appear to have been due, in many cases, to the exceptionally heavy rains experienced in consequence of which storm water gained access to the tanks and rendered the dipping fluid ineffective. Many stock farmers still experience considerable difficulty in maintaining dipping fluids at the correct strength as evidenced by the following figures kindly supplied by the Chemical Research Department:—

Class.	Error in Strength.	1921.	1922.	1923.
Sufficiently correct.	Not exceeding 10%.	45.5	41.68	42.30
Seriously wrong.	11% to 20%.	25.7	26.61	25.54
Dangerously wrong.	Exceeding 20%.	27.8	31.71	32.16
Total number of samples analysed.		705	511	513

Only a small number of dipping tanks were constructed during the year and it is to be regretted that it has not yet been found possible to introduce the Cattle Cleansing Ordinance. There are very few fenced farms in the Colony and, unless cattle dipping

is made compulsory, it is feared that little headway can be made towards eradicating East Coast fever in the European areas until all stock farms in the infected areas are fenced.

The dipping demonstration in the Masai Reserve, for which arrangements were made last year, was abandoned as Government decided to dispose of the cattle with which the demonstration was to be made.

FOOT AND MOUTH DISEASE.

Wide-spread outbreaks of foot and mouth disease occurred during the year in the Laikipia, North Nyeri, Fort Hall, Kiambu, Machakos, Nairobi, Nakuru and Ravine districts and one outbreak occurred at Kibigori Quarantine Station in the Kisumu-Londiani district. From the evidence available it would appear that this disease may be regarded as enzootic in most of our native reserves where it attracts little or no attention on account of the benign course it takes in native cattle. Several of the outbreaks which occurred on European farms involved high grade and pure-bred cattle and it was thought that the disease might assume a more virulent form in such animals. This assumption was not, however, borne out by experience: the mortality was mainly confined to a few sucking calves and the loss of condition and of milk (in dairy herds) was generally negligible. In view of these facts and of the inconvenience and losses suffered through interference with the movements of livestock and of transport cattle it is considered doubtful if the quarantine restrictions imposed at present are justified, particularly when it is realized that the quarantine restrictions, which it is possible to impose, are of little avail in preventing the spread of this disease.

TRYPANOSOMIASIS.

Further outbreaks of trypanosomiasis occurred in the Thika area, Fort Hall district, and as the evidence available pointed to the infection originating in the Ithanga Hills area, where tsetse flies are known to exist, steps were taken to prohibit the movement of cattle from a defined area including the Ithanga Hills and all farms on which it was thought tsetse flies might breed. Owing to lack of staff the Entomologist was unable to arrange to carry out a systematic entomological survey of this area but, in the absence of such a survey, every effort has been made to avoid imposing unnecessary hardships on the farmers involved and, provided the bush on a farm is cleared to the satisfaction of the Department and the cattle on it are healthy, the quarantine restrictions imposed on such a farm will be raised.

Since the action outlined above was taken no fresh outbreaks have come to notice on the farms lying outside the quarantined area.

Outbreaks of trypanosomiasis occurred on certain farms in the Trans-Nzoia district and in the Kaimosi area, Nandi district. The Entomologist failed to find tsetse flies in the areas involved and is of the opinion that they are unsuitable areas for such flies to breed in. It must therefore be assumed that the original infection was introduced by cattle drawn from tsetse fly areas and that the later spread of the disease was effected by mechanical carriers such as Tabanidae and Stomoxys.

ANTHRAX.

The following outbreaks of Anthrax came under notice during the period under review:—

District.	No. of outbreaks.	No. of deaths.	No. of animals involved.
Nairobi. ..	10	28	1,649
North Nyeri ..	6	9	488
Northern Frontier ..	1	3	900
Uasin Gishu ..	2	13	?
Nakuru ..	8	9	3,380
Total outbreaks ..	27		

In addition to the above, isolated outbreaks came under notice in the native reserves of the Nyanza Province.

The outbreaks which occurred in the European areas were dealt with successfully by the adoption of quarantine measures and by the vaccination of all in-contact cattle.

An outbreak of Anthrax was reported amongst Government-owned camels in Jubaland but the mortality was promptly checked by vaccination.

TUBERCULOSIS.

An outbreak of tuberculosis was detected in a herd of 268 cattle on a farm in the Nakuru district. These cattle have been tested with tuberculin with the result that four head reacted to the test.

The only other known infected farm in the Colony is situated in the Kisumu-Londiani district and on which an outbreak occurred in 1922 in a herd of about 250 cattle. This herd was again subjected to the tuberculin test this year and two cattle reacted. These reactors are awaiting slaughter at the Veterinary Laboratory, Kabete.

OTHER DISEASES.

Twenty six outbreaks of *blackquarter* came under notice on European farms during the year resulting in one hundred and

Contagious abortion was reported to be prevalent in the Laikipia district and on certain farms in the Naivasha district and "*Three day Sickness*" was, for a time, very prevalent in the Nairboi, Kiambu and Nakuru districts.

During the year thirty one pure-bred bulls and four pure-bred heifers, all imported cattle, were successfully immunised at the Quarantine Station, Nairobi, against *redwater* and *anaplasmosis*, blood drawn from cattle which were immunised against these diseases at the Onderstepoort Laboratory in South Africa.

Deaths from *heartwater* came under notice in the Masai Reserve and in the Uasin Gishu district. In the latter area a heavy mortality was reported on one farm.

DISEASES OF EQUINES.

ULCERATIVE LYMPHANGITIS.

Seventy seven cases of ulcerative lymphangitis were reported during the year as against one hundred and thirty in the previous year.

The following statement shows the number of cases which occurred in the various districts as compared with last year:—

District.	No. of cases 1922.	No. of cases 1923.
Uasin Gishu—Trans-Nzoia	45	20
Nairobi—Kiambu—Machakos	43	19
Kisumu—Londiani	13	10
Kericho Kavirondo	11	2
North Nyeri	10	7
Nakuru.	8	18
Masai Reserve.	—	1
	130	77

The improvement in the position, in regard to this disease, in the Uasin Gishu and Trans-Nzoia districts is considered very satisfactory and is attributable mainly to the fact that infringements of the quarantine regulations have been severely dealt with by the respective Magistrates.

In the case of the apparent improvement in the position in the Nairobi—Kiambu—Machakos districts this is largely due to the fact that there was a considerable decrease in the number of ponies and mules in these districts.

EPIZOOTIC LYMPHANGITIS.

Sixteen cases of epizootic lymphangitis came under notice during the period under review as compared with thirty two in the previous year.

The following statement shows the number of cases which occurred in the various districts as compared with last year:—

District.	No. of cases 1922.	No. of cases 1923.
Nairobi—Kiambu—Machakos	8	7
Uasin Gishu—Trans-Nzoia	8	1
Londiani—Kisumu	6	2
Nakuru	7	2
Kericho—Kavirondo	3	3
Nyeri	—	1
	32	16

Nine of the sixteen cases referred to were destroyed, two died and the remaining five were treated.

GLANDERS.

The Colony still remains free from glanders. One hundred and sixty seven horses and one hundred and fifty two mules imported from Abyssinia during the year successfully passed the mallein test.

HORSE SICKNESS.

One hundred and sixty nine deaths from horse sickness were recorded during the year and, of these, one hundred and six occurred in the West and North Kenya areas (North Nyeri district) and in the quarantine station at Isiolo (Northern Frontier District).

In a racing stable near Nairobi several cases of what was thought to be "ephemeral fever" occurred in June—the affected horses showing no other symptoms than a high temperature, which persisted for a few days, with injection of the visible mucous membranes. Blood was drawn from two cases and sent to the Onderstepoort Laboratory in South Africa where the authorities very kindly agreed to inoculate some of the blood into a susceptible horse. The inoculated horse developed typical horse-sickness and died on the fourteenth day after inoculation. Further reference to this subject is made in the annual report of the Acting Chief Veterinary Research Officer.

DISEASES OF SHEEP & GOATS.

Owing to the high prices which wool is now fetching on the home market most sheep owners are paying much more attention to their sheep than formerly, and the assistance of the Department is, in consequence, in more frequent demand. Sheep scab is still prevalent in most flocks but there are indications that dipping is being carried out more systematically and more thoroughly than in former years. Efforts are also being made to check the ravages of the wire worm and 134,200 doses of the South African remedy were prepared and issued from the Laboratory during the year. Sheep and goat pox appeared in the Embu native reserve in November and was reported to have caused serious losses amongst the native sheep and goats. Sheep pox also appeared on a farm in the Naivasha District towards the end of the year and although the mortality in some of the grade flocks was small it is reported to have been heavy in others. A vaccine against this disease is being prepared at the Laboratory.

A heavy mortality amongst lambs in the Elmenteita district was reported in November and investigations are in progress with a view to discovering the cause.

A few outbreaks of blue-tongue came under notice during the year and a vaccine against this disease is now prepared at the Laboratory.

DISEASES OF SWINE.

Only one outbreak of so-called East African Swine Fever came under notice during the year. This outbreak occurred in a lot of sixty pigs, fourteen deaths occurred and, as many of the remaining pigs were infected, the owner destroyed them all.

DISEASES OF DOGS.

Twenty-five dogs imported from India and France were passed through the Quarantine Station at Nairobi, and no cases of rabies were reported in the Colony, during the period under review. A severe outbreak of distemper which rapidly became widespread caused a heavy mortality throughout the Colony.

DISEASES OF POULTRY.

The only condition which came under notice as a cause of serious losses in poultry was Kikuyu Fowl disease. The vaccine produced at the Laboratory against this disease continues to give satisfactory results.

STOCK TRADING.

There has been little or no demand for cows and heifers during the past twelve months owing to the general depression affecting the cattle industry but there has been a good demand for breeding ewes.

The demand for work oxen is a considerable and increasing one particularly for oxen drawn from the areas where East Coast Fever is regarded as enzootic. This is due to the development of crop production on a large scale on the European farms generally and the energies of the Department have been severely taxed to provide the necessary facilities for the purchase of the required oxen.

The quarantine station at Machakos was barely able to cope with the numbers of oxen purchased from the Machakos native reserve during the last four months of the year and a quarantine station was opened at Kibigori in May, to deal with cattle drawn from the native reserves of the Nyanza Province. Unfortunately a very large percentage of the cattle admitted to the Kibigori station proved to be infected with pleuro-pneumonia and this seriously affected the trade there. Arrangements are being made to open a quarantine station in the Trans-Nzoia district to deal with cattle purchased in the Northern portion of the North Kavirondo district, where the cattle are now believed to be free from rinderpest and pleuro-pneumonia, and it is hoped that it will be found possible to open other quarantine stations in the Nandi and Masai Reserves. Whether the two last mentioned stations will prove to be successful from a financial point of view or not will depend on the results obtained by the Laboratory serological test on the cattle admitted to them and on the prices obtainable for the cattle on release.

A large percentage of the Nandi and Masai cattle are susceptible to East Coast Fever and the prices obtainable for these susceptible cattle will, naturally, be lower than those obtainable for oxen considered to be immune.

LIVESTOCK IMPORTATIONS.

The livestock importations through the ports of Kilindini and Mombasa for the past twelve months were as follows (the return for the last year is also given for purposes of comparison) :—

	1922.	1923.
Horses	19	30
Cattle	625	323
Sheep and Goats ..	3,801	4,342
Pigs	—	12
Camels	78	27
Mules	2	1
Donkeys	24	20
Dogs	120	68
Cats	4	17
Poultry	244	219

The importations included—86 purebred sheep from Australia, South Africa and England; 13 race horses from England and South Africa; and 37 purebred cattle from England and South Africa.

MEAT INSPECTIONS.

The following abattoir returns have been received from Nairobi, Mombasa, Lumbwa and Nyeri :—

	Number of cattle slaughtered	Number of sheep and goats slaughtered	Number of pigs slaughtered	Percentage of beef carcases con- demned on account of measles
Nairobi	8,846	19,884	1,363	3.5
Mombasa	2,962	7,816	3	?
Lumbwa	266	673	102	2.6
Nyeri	35	202	—	2.9

BRANDING OF STOCK ORDINANCE 1907.

The following are the particulars of brands registered, transferred and cancelled during the period under review :—

Brands registered	...	83
Brands transferred	...	3
Brands cancelled	...	1

The following branding irons were issued :—

To Government Departments	...	67
To the Uganda Protectorate	...	34
To private individuals	...	98
"S" brands supplied	...	17
Sets numerals	...	4

RESIDENT NATIVES ORDINANCE, 1918.

It is to be regretted that the provisions of this Ordinance are not yet properly enforced in most districts in as far as they apply to the branding and checking of squatters' cattle. As long as squatters' cattle remain unbranded and their numbers unchecked so long will uncontrolled and illicit movements of cattle take place between the native reserves and the European-owned farms on which the squatters are resident.

W. KENNEDY.
Chief Veterinary Officer.

Ref. No. 55.

APPENDIX "C",
REPORT
OF
THE CHIEF VETERINARY
RESEARCH OFFICER,
KABETE.

FOR THE PERIOD,
JANUARY 1st 1923 TO DECEMBER 31st 1923.

Sir,

I have the honour to submit the Fifteenth Report of the Veterinary Research Division for the Financial Year 1923.

A. STAFF MOVEMENTS.—

The following Officers proceeded on Vacation Leave during the Year :—

- Mr. J. Walker, *Chief Veterinary Research Officer.*
- „ S. H. Whitworth, *Veterinary Research Officer.*
- „ A. Walker, *Laboratory Superintendent.*
- „ W. White, *Clerk.*
- „ L. Myers, *Clerk.*
- „ H. J. Gray, *Laboratory Assistant.*
- „ J. Forsyth, *Yard Foreman.,*

and the following arrived from Leave :—

- Mr. A. Walker, *Laboratory Superintendent.*
- „ J. T. Schultz, *Laboratory Assistant.*
- „ P. H. Poolman, *Laboratory Assistant.*
- „ A. J. Kemp, *Clerk.*

APPOINTMENTS. (1st Tour).—

Miss N. Judd, was appointed to the Post of Junior Clerk on the 1st April 1923, rendered vacant by the resignation of Miss A. Gray.

Mr. J. S. McDonald, was appointed to the Post of Junior Laboratory Assistant on the 20th July 1923, rendered vacant by the resignation of Mr. C. Gray.

This Officer arrived at the Laboratory on the 28th October, 1923.

RESIGNATIONS.—

Mr. C. Gray, Junior Laboratory Assistant, resigned his appointment on the 9th February 1923.

Miss A. Gray, Junior Clerk, resigned her appointment on the 16th February 1923.

VACANCIES.—

The following Post remained unfilled throughout the year :
One Veterinary Research Officer.

ACTING APPOINTMENTS.—

Mr. W. Kearney, M.R.C.V.S., Assistant Chief Veterinary Research Officer was appointed to the post of Chief Veterinary Research Officer during the absence on Leave of Mr. J. Walker, M.R.C.V.S., with effect from the 9th July 1923.

Mr. J. T. C. Bradshaw, M.R.C.V.S., Veterinary Research Officer was appointed to the Post of Assistant Chief Veterinary Research Officer, vice Mr. W. Kearney, Acting Chief Veterinary Research Officer, with effect from the 9th July, 1923.

Mr. A. J. Kemp, Clerk, was appointed to the Post of Laboratory Superintendent, during the absence on Leave of Mr. A. Walker, with effect from the 18th April 1923.

ARRIVALS. (For duty).—

One Field Veterinary Officer and one Stock Inspector were attached to the Laboratory for duty during a portion of the year.

TRAVELLING.—

Officers of the Laboratory visited the undermentioned parts of the Colony, to investigate outbreaks of diseases, viz.,

Eldoret, Lóndiani, Nakuru, Escarpment, Naivasha, Thika, Nanyuki and N'gong.

B. ADMINISTRATIVE ACTIVITIES.—

CORRESPONDENCE.—

2,095 Inward and 2,197 Outward papers were dealt with during the period under review—a total of 4,292. This does not include confirmation of telegrams, communications received with slides and Laboratory Reports submitted in connection therewith—or the numerous letters and papers sent to the Laboratory for minuting.

LABORATORY FARM WORK.—

About the end of February, part of the Kabete experimental Farm was taken over for the rearing of Stock for special experiments.

Apart from the usual cultivation connected with the production of foodstuffs for Laboratory animals, a great deal of work was done with metalling roads, repairing fences and general upkeep of Farm.

The following foodstuffs were produced :—

181 tons Ensilage.

30 tons of Maize Grain.

30 acres of land at the Nairobi Quarantine area were put under cultivation for the production of green food.

A 20 acre field was cultivated for the Plant Breeder, in connection with his experiments.

A. BUILDINGS.

BUILDINGS AND PLANT.—

No buildings were erected by the Public Works Department during the period under review, but considerable improvements by way of alterations and additions were effected by our own Mechanic, in so far as outbuildings for Livestock and Quarters for non-Europeans were necessary.

The following is a synopsis of the work carried out in this section :—

Erection of two Maize Drying Sheds ; Construction and erection of cattle Crush ; Weighbridge with overhead covering ; Rebuilding of Night Watchmen's Shed ; Erection of Transport Vehicle Shed ; Repairs to Laboratory Staff Quarters ; Construction of new Quarters for Artizans commenced ; Re-building of rabbit runs and sheds ; Repairing and whitewashing all cattle Sheds where necessary ; Painting of all Staff Bungalows.

In addition to the foregoing, repairs to the Boma Buildings at the old Government Farm and the Shed over the existing Crush there, were effected.

B. PLANT.—

A lot of work was carried out in our own Workshops thus obviating a large item of expense in placing orders in Nairobi as was the custom previously. This also enabled the work here to continue uninterruptedly.

STEAM PLANT.—

This Plant was completely overhauled during the year, and is now working satisfactorily.

GAS PLANT.—

No. 1 Gasometer tank was fitted with new plates and was re-erected. New gas Incubators were installed in the Laboratory.

ELECTRIC PLANT.—

New electrical Centrifuges were installed in the Laboratory. The whole of the Staff Quarters were electrically lighted throughout.

WATER SUPPLY.—

Considerable inconvenience was again experienced through the inadequacy of our water supply. A larger water main than our present 1" feed pipe is becoming urgently necessary.

GENERAL.—

Improvements were effected to the existing drainage system, roads, etc., which may be briefly summarised as follows, viz.,

Laying down of concrete foundations, pillars, culverts, etc. Construction of sanitary soakage pits at back of Bungalows. Stone drain from Workshop encircling grain store building.

Roads were repaired and kept in good condition and some new deviations were made in front of the Laboratory.

The tramway line was improved and rebuilt where necessary.

FINANCE.—

EXPENDITURE.—

The total sanctioned expenditure for the Division of Veterinary Research during the Year 1923, was £25,110. The actual expenditure amounted to £22,110; savings being effected to the extent of £3,000.

REVENUE.—

Owing to little or no demands for anti-rinderpest serum from other Countries, the revenue realised from the sale of Laboratory Products is approximately, £4,000 only, as against £5,300 for the year ended 1922, £7,700 for the nine months of 1921, and £22,124 for the period April 1st 1920 to March 31st 1921.

This is exclusive of Revenue accruing from anti-rinderpest serum used by the Veterinary Division Staff for inoculation in the Field, such Revenue being included in the Veterinary Division Books under the Sub-head "Testing, Dipping, Fees, etc."

Anti-rinderpest serum to the value of £4,000 was issued to the Field Staff during 1923.

The total value of Laboratory Products that were manufactured during the Year for which charges are gazetted is £10,000. This figure is exclusive of other products which are issued free of charge.

The sale of surplus Laboratory Stock not required for further experiments, realised £690.

LIVESTOCK.

Species	On Books 31-12-22	Received during 1923	Remaining on Books 31-12-23.
Horses	11	33	17
Mules	31	28	31
Donkeys	—	—	—
Cattle	960	490	730
Sheep	86	81	93
Goats	23	32	24
Pigs	80	36	86

TECHNICAL WORK.

A. ROUTINE.—

1. The examination of Specimens submitted for diagnosis occupied a considerable increase of time over previous years. As compared with 2,753 specimens examined last year there were, 6,553 examined during 1923. The increase was mostly due to the specimens of blood for the diagnosis of Contagious bovine pleuro-pneumonia by the Conglutination method.

The classification of the diagnoses made is as follows :—

BOVINES	TOTAL EXAMINED	6,174
Anthrax	33	
Arsenical poisoning	2	
Anaplasmosis	242	
Anaplasmosis and Anaemia	1	
Anaplasmosis, Redwater & Trypanosome Brucei	1	
Acute Meningitis	1	
Blackquarter	9	
Broncho-pneumonia	2	
Bacillary Necrosis	2	
Contagious Abortion	49	
Contagious bovine pleuro-pneumonia	211	
Cysticerous bovis	3	
Doubtful Contagious Abortion	5	
Distomatosis	2	
East Coast Fever	349	
East Coast Fever and Redwater	11	
Hair Ball	1	
Mange	2	
Miliary Tuberculosis	1	
Parasitic infection	1	
Redwater	56	
Redwater and Anaplasmosis	20	
Streptothricosis	2	
Small Piroplasms	6	
Suspicious Anthrax	1	
Suspicious Blackquarter	3	
Suspicious Contagious bovine pleuro-pneumonia	35	
Suspicious East Coast Fever	9	
Suspicious Redwater	2	
Trypanosomiasis and Redwater	2	
Trypanosomiasis	34	
To Analyst	2	
Awaiting diagnosis	54	
Negatives	5020	
EQUINES (Horses)	TOTAL EXAMINED	122
Biliary Fever	1	
Epizootic Lymphangitis	7	
Mixed Pyogenic Infection	1	
Streptococci	4	
Streptothricosis	2	
Suspicious Ulcerative Lymphangitis	5	
Suspicious Epizootic Lymphangitis	1	
Ulcerative Lymphangitis	48	
Negatives	53	

EQUINES (Mules)	TOTAL EXAMINED	64
Biliary Fever		1
Epizootic Lymphangitis		9
Mixed Pyogenic Infection		2
Suspicious Ulcerative Lymphangitis		2
Ulcerative Lymphangitis		22
Negatives		28
EQUINES (Donkeys)	TOTAL EXAMINED	4
Trypanosomiasis		1
Negatives		3
BOVINES	TOTAL EXAMINED	22
Anthrax		1
Blackquarter		1
Distomatosis		1
Mixed bacterial infection		1
Streptococci		1
Tapeworm		1
Awaiting Diagnosis		2
Negatives		14
CAPRINES	TOTAL EXAMINED	8
Anthrax		2
Amphistomum Conicum		1
Phthiriasis		1
Strongylidae, probably Str. convolutus		1
Negatives		3
CANINES	TOTAL EXAMINED	60
Acute Congestion of the Lungs		1
Mange		1
Streptococci		1
Slight Enteritis		1
Tick Fever		17
Trypanosomiasis		2
Negatives		37
PORCINES	TOTAL EXAMINED	6
Too decomposed		1
Negatives		5
TICKS	TOTAL EXAMINED	1
Amblyomma variegatum		1

GAME (Bushbuck)	TOTAL EXAMINED	1
Negatives		1
GAME (Cheetah)	TOTAL EXAMINED	1
Negatives		1
GAME (Hippopotamus)	TOTAL EXAMINED	1
Negatives		1
AVIANS (Fowls)	TOTAL EXAMINED	79
Kikuyu Fowl Disease		27
Air Sac Disease		1
Arsenical poisoning		1
Broncho-pneumonia		1
Septic-pneumonia		1
Egg Bound		1
Phthiriasis		1
Parasitism (External and Internal)		1
Peritonitis		5
Tuberculosis		1
Tapeworm infection		4
Sarcoma		5
Roup		1
Negatives		29
AVIANS (Ducks)	TOTAL EXAMINED	3
Negatives		3
AVIANS (Turkeys)	TOTAL EXAMINED	7
Broncho-pneumonia		1
Diphtheria		1
Kikuyu Fowl Disease		1
Tuberculosis		1
Negatives		3

2. The preparation and testing of Laboratory Products is a big drain on the energies of the technical staff and during the year under review the output was well up to average. There was a diminished output of anti-rinderpest serum but on the other hand, there was a very large demand for Wireworm Remedy for Sheep.

The following Table shows the amounts of the various products which were prepared and issued during the Year :—

PREPARATION OF LABORATORY PRODUCTS.

The following Table shews the amounts of serum, vaccines, etc., prepared and issued during the period under review:—

Product.	Quantity on hand on 31.12.22.	Prepared by the Laboratory during the Year.	Issues for Year.	Balance on hand on 31.12.23.	Returned to the Laboratory.	Remarks.
Anti-rinderpest serum.	1,827,200.	4,473,750.	4,237,000.	3,331,700.	1,267,750.	c. cs.
Blackquarter vaccine, 1st.	50.	19,250.	14,920.	4,770.	390.	doses.
Blackquarter vaccine, 2nd.	20.	19,070.	15,230.	4,610.	750.	"
Trypanblue, Canine.	29.	578.	561.	76.	30.	"
Trypanblue, Bovine.	45.	127.	161.	11.	—	"
Colon Bacillosis vaccine.	147.	10,713.	9,805.	1,158.	103.	"
Kikuyu Fowl Disease vaccine.	—	6,529.	6,529.	—	—	" cs.
Ulcerative Lymphangitis vaccine.	720.	5,695	3,890.	2,525.	—	doses.
Anthrax vaccine, Single.	3,045.	—	—	3,045.	—	"
Anthrax vaccine, 1st.	18,200.	20,480.	10,270.	28,760.	350.	"
Anthrax vaccine, 2nd.	14,680.	19,240.	10,450.	23,820.	350.	"
Bluetongue vaccine.	11,006.	2,970.	280.	13,696.	—	"
Wireworm Remedy.	38,600.	111,200.	134,200.	15,600.	—	"
Pleuro-pneumonia vaccine.	—	181,305.	181,305.	—	—	"
Redwater and Anaplasmosis.	—	142.	142	—	—	"

Details of the Issues are shewn below:—

Products.	Stockowners.	Dept. Officers.	Other Countries.	Total Issues.
Anti-rinderpest serum.	..	2,051,750.	1,800,000.	4,237,000. ^a c. cs.
Blackquarter. 1st.	..	5,860.	—	14,920. ^a doses.
Blackquarter. 2nd.	..	5,860.	—	15,230. ^a "
Trypanblue, Canine.	..	423.	—	561. ^a "
Trypanblue, Bovine.	..	83.	—	161. ^a "
Colon Bacillosis.	..	116.	—	9,805. ^a "
Kikuyu Fowl Disease.	..	—	—	6,529. ^a "
Ulcerative Lymphangitis.	..	2,660.	—	3,890. ^a c. cs.
Anthrax vaccine, Single.	..	—	—	—
Anthrax vaccine, 1st.	..	7,380.	—	10,270. ^a doses.
Anthrax vaccine, 2nd.	..	7,560.	—	10,450. ^a "
Bluetongue vaccine.	..	—	—	280. ^a "
Wireworm Remedy.	..	1,700.	—	134,200. ^a "
Pleuro-pneumonia.	..	139,395.	21,400.	181,305. ^a "
Redwater and Anaplasmosis.	..	—	—	142. ^a "

COURSE OF INSTRUCTION.

Mr. G. Plant, Junior, arrived at the Laboratory on the 25th September 1923, for the purpose of acquiring a knowledge of stock diseases and their treatment, with the view of taking up Veterinary studies at home.

B. INVESTIGATIONAL WORK.

The absence on leave of the Chief Veterinary Research Officer and Veterinary Research Officer Whitworth made it impossible for us to undertake Research to any great extent but some experimental study was given to those diseases which appeared to demand immediate investigation in order to prevent undue losses to Stockowners.

The following is an abbreviated account of the work done in this branch :—

1. DISEASE OF CATTLE:—

Contagious Pleuro-pneumonia.—

a. Serum diagnosis of:—

Great strides were made by Mr. Walker, the Chief Veterinary Research officer, in perfecting the Conglutination test for this disease and at the time of his departure on leave in July he published a detailed description of his technique which is not considered necessary to insert here. Since his departure, however, further work has been carried out with the method, principally with a view to simplifying the process, so that a larger number of animals could be tested by one individual than was possible previously and thereby enhancing the value of this test in the eradication of the disease.

Our experiments also added further proof to the reliability of the test.

Up to date some 1,500 head of cattle have been subjected to this test and the results have been completely satisfactory in so far as we have been able to judge from the post-mortem examinations made by ourselves and those carried out in the field.

Of 92 head reported positive with Conglutination test, 56 have been slaughtered and in every case the infection was proved at the autopsy. In a number of these cases, the animals before slaughter appeared in a perfectly healthy and robust state and at the post-mortem examination nothing more than a small sequestrum remained, and even in a few, the lung itself had healed out completely leaving but a chronic pleurisy thus indicating the extreme reliability of the test.

Some interesting observations were also made at the Laboratory on thirteen infected cattle.

On their arrival here all these animals gave positive reactions with the test. In the course of a few months, however, three of them became only partial positives and were slaughtered for post-mortem examination. Two out of the three shewed their lungs to have healed out and a pleurisy only remained, the other having a tiny lesion (sequestrum) the size of a marble in one lung.

Five of the balance, later became negative, and at the post-mortem four shewed but a pleurisy and the other being entirely negative.

This reveals,

- (1) that seven out of thirteen or nearly 54% had recovered from the disease to date. This percentage is likely to be increased when observations are completed on the balance.
- (2) that complement fixing bodies can be demonstrated in the serum of cattle for some time after the lesions in the lung have healed out and, therefore,
- (3) that a positive reaction to the conglutination test does not necessarily mean that the beast is in an infective stage of the disease at the time its serum is collected.

One of the drawbacks to the test is the anti-complementary nature of some sera, but this is being overcome and at present not more than 2% of the sera defy giving definite results. Investigations are proceeding in this direction.

A very helpful addition to the agents employed in the test has recently been made. Instead of using virus from swellings on inoculated animals, an artificial culture of the organism prepared after the method of Von Dr. Cl. Giese is employed and the results have been most satisfactory. In addition to the clear reading obtained with it, there is a great saving of labour and material.

We have also been able to demonstrate that it is no longer necessary for sera to be tested, to reach the Laboratory in so short a time as 24 hours. As long as blood is collected in a sterile state and kept from undue heat and light, this period can be considerably increased.

At present it is possible for one man to test up to 100 head of cattle per day, and it is anticipated that with the arrival of special equipment on order, this figure will be doubled. With practice and experience the test, which at first was tedious and cumbersome is now becoming a simple operation.

Great credit is due to Mr. Ford, Laboratory Assistant, for the painstaking way he has applied himself to this work.

b. *Vaccination against.*—

As recorded in the last Annual Report, it was found that our original culture vaccine, Strain 4,845, was decreasing in potency and fresh strains had to be substituted. Cultures Nos. 6,932 and 8,013 were selected for testing. The former gave a good percentage of mild reactions and the latter was found to be too virulent for use as a vaccine in the field. An immunity test was carried out by the inoculation of virulent material in all the animals previously treated with the culture and also in 12 clean or non-inoculated beasts. The result of this immunity test was that faint reactions occurred in a small percentage of the previously treated beasts but no mortality occurred, whilst 100% of the non-inoculated lot reacted severely and 75.5% died or were destroyed in extremis. (see Tabulated Sheet No. 1. Page 56).

EXPERIMENT NO. 1,500.—.....Commenced 6.12.22.

To test Pleuro-pneumonia strains, Nos. 6,932 and 8,013, and the resistance obtained therefrom.

FIRST INOCULATION.

IMMUNITY TEST.

6.12.22.	Age.	Genera- tion.	Re- actions.	Deaths.	22.1.23. (R. shdr).	Culture age.	Gene- ration.	Reac- tions.	Reacted both times.	Deaths.
43 Bovines inoc: (L. shdr), with P.p. 6,932.	6 days.	41.	68.2%	Nil.	Again inoc: P.p. 8,245.	6 days.	1.	23%	15.3%	Nil.
43 Bovines inoc: (Tail), with P.p. 6,932.	"	"	88.3%	Nil.	do.	do.	do.	33.3%	30.2%	Nil.
43 Bovines inoc: (L. shdr), with P.p. 8,013.	"	9.	67.4%	16.2%	do.	do.	do.	26.4%	17.1%	Nil.
43 Bovines inoc: (Tail), with P.p. 8,013.	"	"	90.5%	4.6%	do.	do.	do.	15.3%	13.1%	Nil.
					12 Controls.	do.	do.	100%.	—	75.5%.

Some of the animals were slaughtered in extremis for

Antigen, and one was mauled by wild animals, but the re-
actions were so strong, they would have undoubtedly died.

All the reactions obtained in the immunity test were negligible and in no case did the swellings increase to more
than 1.5 x 1.5 inches, whilst the majority of the controls shewed huge swellings implicating all dependent parts.

Culture strain 6,932 was, therefore, considered satisfactory for issue as a vaccine in the Field. No unfavourable reports have been received during the Year.

Strains of pleuro-pneumonia were forwarded to the Veterinary Laboratory, Tanganyika, for purposes of vaccine production. Some difficulty was experienced at first in getting the cultures to grow there. Cultivation was subsequently successful with strains which were taken away by the Veterinary Pathologist, Tanganyika, after his visit to Nairobi, but unfortunately, these gave no reactions on experimental inoculation. More virulent cultures will be forwarded when available.

RINDERPEST.—

Research work on this disease had to be curtailed during the greater part of the year owing to the shortage of Officers. Experiments with Sheep and Goats blood for double inoculation purposes already reported upon in the previous Annual Report were suspended until recently, when an experiment on a large scale was undertaken. This we hope will definitely prove the suitability or otherwise of Sheep's blood for double inoculation of cattle susceptible to Redwater and Gallsickness.

The following is recorded to shew the great danger of heavy losses that may occur through the use of Redwater infected blood when double inoculating animals that have been regularly dipped from birth.

Ten young dipped grade steers were brought to the laboratory for immunisation against Rinderpest prior to use as pleuro-pneumonia antigen producers.

They each received 2 c.cs Rinderpest virulent blood (containing a Redwater infection) and serum, Brew No. 160, at the rate of 15 c.cs per 100 kilos. Eight of the animals died between the 9th and 14th days after inoculation and on 'post-mortem, Redwater lesions were predominant.

To indicate whether Redwater per se would have caused such heavy losses, two more young animals similarly dipped from birth were inoculated with blood containing Redwater and Anaplasmosis infection only. These reacted to both diseases but recovered spontaneously. Further, Brew 160, was subjected to another potency test. Animals used in this case were immune to Redwater and Gallsickness, they contracted Rinderpest through the inoculation, reacted normally, and no mortality followed.

We, therefore, find:—

1. that Redwater and Anaplasmosis alone when inoculated into two susceptible animals did not kill them.

2. that serum, Brew 160 protected 100% of animals which were already immune to Redwater.
3. that a Redwater infection running concurrently with Rinderpest caused a mortality of 8 out of 10 beasts in spite of the protection afforded by serum.

REDWATER & ANAPLASMOSIS.—

Vaccination against.—

During the period under review thirty-five imported animals have been successfully vaccinated against the above diseases. Their resistance was subsequently reinforced by the inoculation of local strains of Redwater and Anaplasmosis.

Vaccination invariably produced an infection of *Anaplasma centrale*, but reactions to the Redwater infection were weak and few and the presence of *Babesia* in the blood was exceptional.

During the resistance tests with local strains, *Babesia* appeared in the peripheral blood in most cases. Reactions to this infection were usually of a mild nature, although in two cases symptoms of Haematuria were present, a good percentage of the animals recovered spontaneously from this infection, but whenever the blood infection was high or when signs of illness appeared, Trypanblue was administered without delay and this promptly brought about recovery.

In the majority of cases the reaction to *Anaplasma marginale* (local stain) was of a very mild nature, but in at least one instance, a severe reaction took place and the beast required careful attention.

This double method of immunisation has proved successful therefore. The animals treated were highly susceptible to Redwater and Gallsickness and the death rate would have been heavy had they been taken to infected veldt without this treatment.

Owing to the tendency of the Redwater infection to die out in the blood unless constantly maintained, it is advised that ticks should be allowed to get access to inoculated animals from time to time, so that the resistance to Redwater will be kept up.

One of the great drawbacks to this inoculation up to the present has been the length of time that animals have to be kept under observation. It must be remembered, however, that the introduction of this method of vaccination to this country is only recent, and very little experimental work was carried out on the subject owing to lack of suitable animals, and great caution had to be observed to avoid bad results.

As we are getting more familiar with the behaviour of the blood vaccine and the subsequent inoculation with local virulent strains, it is hoped that animals treated in future will be detained for considerably shorter periods than previously.

TESTING & PRESERVING REDWATER AND ANAPLASMOSIS STRAINS IN CALVES.—

Since the arrival of the vaccine producers it has been necessary to provide animals for testing and preserving the vaccine strain:—

For this purpose, cows near calving were picked out, dipped and carefully inspected in regard to tick infestation. They were then placed in a tick free stable and allowed to calve-down there. The calves are kept constantly in that stable and used up as required. No local hay or other fodder likely to contain ticks is allowed in the house: the animals are bedded down with sawdust and fed on lucerne and ensilage. In this way a number of suitable young animals have been reared for testing and preserving the vaccine strain. The majority have been transferred to other experiments, but we have at present six young beasts in the tick-free house.

Three of these animals which are now between 15 and 22 months old have been inoculated at different periods with blood derived from the vaccine producers. One of these shewed a rise of temperature during the period of incubation for Redwater, but parasites were never demonstrated in any of them. All three were positive to *Anaplasma centrale* infection.

The three others which are now between 3 & 4 months old have not been inoculated and are still available for use.

INFECTIOUS ABORTION.

Preventive inoculation with living-culture vaccine was introduced after the method employed by Sir Stewart Stockman, in England. It has been tried on two Estates but the results obtained therefrom will not be available for some time.

In view of the widespread nature of this complaint and the high economic losses experienced through it by a number of farmers, it is urged that all cases of Abortions be notified to the Veterinary Authorities and preventive vaccination undertaken where it is considered advisable.

Vaccination is only recommended in herds where the disease exists and from the experience of Veterinarians throughout the World, the losses of calves in infected herds are materially reduced by the use of this living-culture vaccine.

THREE DAYS SICKNESS.

This disease has been reported from many districts during the Year; and at the Laboratory we had an opportunity of making some observations on the clinical aspect of the disease.

Since the short rains in November, cases have almost daily been picked out from our experimental, working and breeding herds.

All cases began with extreme stiffness sometimes affecting only one limb but usually occurring in a generalised form preventing the animals from moving except under pressure and then with evidence of acute pain. There was a temperature reaction, usually only reaching to 104° F. or thereabouts during the crisis. Rumination and feeding were suspended and the bowels were sluggish. The eyes were glaring and the face was "pinched" as evidencing pain.

No treatment, beyond complete rest in a house, was undertaken and no mortality occurred. All animals were returned to their mobs, usually on the third day.

2. DISEASES OF EQUINES.—

Horse-Sickness.—

The prevalence of this disease after the long rains led to some interesting observations.

In a racing stud of highly bred horses, the writer had the opportunity of seeing an outbreak which he was unable to diagnose as Horse-sickness from clinical observations alone. Some four animals in this Stable developed symptoms of fever, general malaise, slight congestion of the conjunctivæ, inappetence, some constipation and slightly increased respiratory and pulse rate. The duration of the symptoms was on an average about one week and at no time were there any alarming signs of sickness. All animals recovered without treatment.

Blood of two of the beasts was sent to South Africa, however, from where we have just received a report stating that a reaction to Horse-sickness developed in one of their animals as a result of the inoculation of this blood, and that the inoculated animal died of typical Horse-sickness fourteen days after the infection.

Similar clinical manifestations of a mild illness unlike Horse-sickness were seen by other Veterinary Officers throughout the Colony and if we assume as we should do from the similarity of the symptoms, that these cases were of the same nature as those described above, then there has occurred a form of Horse-sickness of unusual mildness and of an atypical kind in which natural recoveries were the rule rather than the exception.

LYMPHANGITIS.

The experimental treatment of Ulcerative Lymphangitis has been carried out at the Laboratory throughout the Year and the results were encouraging.

The best results so far appear to be obtained with a "de-fatted" vaccine prepared from mass cultures of the bacillus Priesz-Nocard. The work is still proceeding.

The treatment of Epizootic Lymphangitis with Sodium Potassium Tartrate by intra-muscular administration gave very disappointing results and was suspended.

DISEASE OF SHEEP.

With the development of the wool industry and the increase in the sheep farming community, diseases of sheep are assuming an importance not yet experienced in the Colony. Ailments which were unknown in the past are now coming to light. A good deal of correspondence of an advisory nature has been sent out to those Sheep owners in remote districts, where Laboratory investigation was impracticable.

1. A pneumonia of sheep said to resemble that form known as Jagziekte in South Africa has been reported from two centres, but unfortunately opportunity for studying the complaint did not arise during the year.

2. A very high mortality in lambs from a disease resembling Colon Bacillosis has occurred in a number of large ranches and material supplied to the Laboratory has afforded a bacteriological study of the complaint. An organism has been isolated and some experimental inoculations carried out with a vaccine prepared from it. The report of one farmer who used this vaccine was very favourable. A stock culture of the organism is being retained until the next lambing season in case a further opportunity will arise for its use.

3. Sheep scab has caused a good deal of expense and worry to a number of owners and unfavourable reports have been received on the use of some well known dipping agents.

In the eradication of scab, the all important factor (next to reliable dipping solutions and there are many of these, e.g., Lime Sulphur ; Caustic Soda-Sulphur ; Coopers and other proprietary dips) is the efficacy with which the dipping is carried out.

At least two and where practicable three immersions of the infected sheep should be made in the solution, at intervals of *ten days*. Dipping at longer or shorter intervals will not give satisfactory results. The entire body of the sheep must be completely submerged for the length of time quoted in the instructions accompanying the dipping agent ; this is usually two minutes. Even the head must be submerged for a few seconds during the operation.

At least three weeks must elapse before the dipped sheep are allowed to return to their old Bomas, so as to avoid re-infection.

4. It is satisfactory to note that farmers are taking the advantage of using our Wireworm Remedy and with excellent results. The issue of 134,200 doses of the Remedy during the year is a good indication of its popularity.

5. Nodular-worm disease (*Oesophagostomiasis*) has also been brought to our notice and beyond advice as to preventive measures nothing further was done with this.

DISEASES OF POULTRY.

KIKUYU FOWL DISEASE.

The vaccination of susceptible fowls was practised on a large scale by poultry owners and with good results. This vaccination is a simple one and usually without harmful effects. It protects fowls for, at least, a year and probably for life time against natural attacks of the disease.

It is strongly advocated that fowls be vaccinated before the natural disease breaks out in the runs.

A large number of well-bred Cockerels were vaccinated at the laboratory for distribution to Natives in the Reserves.

I have the honour to be

Sir,

Your obedient Servant,

W. Kearney

Ag. Chief Veterinary Research Officer.

APPENDIX "D".

ANNUAL REPORT

OF THE

ENTOMOLOGIST

FOR THE YEAR 1923.

Department of Agriculture.
Henry Scott Agricultural Laboratories.
31st December 1923.

The Honourable,
The Director of Agriculture.

Sir,

I have the honour to submit, herewith, a Report on the work done during the year ending 31st December 1923.

STAFF CHANGES.—

Mr. B. F. Ratcliffe, Junior Clerk, began work on the third of May.

TRAVELLING.—

I was absent from the Laboratory for 66 nights and travelled 3,992 miles, by car, on Government Service.

January.—Inspection, etc., of the export sheds at Kilindini in connection with the export of maize ; spraying experiments for coffee green scale, Thika District.

February.—Continuation of spraying experiments ; preliminary survey, Tsetse Fly, Ithanga Hills.

March.—Inspection of nurseries, Karura ; spraying experiments Ruiru District.

June.—Inspections at Mombasa and Waa, at the request of the Honourable, The Director of Education.

July.—Flax caterpillar, Nioro ; Fly survey and quarantine line Ithanga and Kakuzi Hills.

August.—Fly survey continued ; Flax caterpillar, Njoro ; Inspection of coffee plantations, Nyeri District.

September.—Quarantine line, Kakuzi and Ithanga Hills.

October.—Spraying experiments for coffee mealy-bug, Thika District.

November.—Visit to the Kaimosi, Uasin Gishu, and Trans Nzoia Districts to investigate coffee disease generally, to attend and address meetings of planters ; to enquire into the reported presence of Tsetse Fly on the Nzoia and Noigamaget Rivers.

December.—Continuation of the above visit ; spraying experiments for coffee mealy-bug in the Thika District.

CORRESPONDENCE.—

1,041 letters have been dealt with ; the subjects are summarised as follows :—

Bees and Wax	13
Blood-sucking Flies and Ectoparasites	42
Citrus	7
Coffee	202
Cotton	4
Flax	6
General	177
Household Insects	6
Importation of Plants	214
Identification of Insects	56
Maize	27
Sericulture	68
Staff	67
Stored Products	23
Upkeep of Laboratory	129
	1,041

1. A paper on "Insect Pests of Coffee" was prepared and read at the Annual General Meeting of the Coffee Planters Union. This was published in the Farmers' Journal, August 9th.

2. The Articles on Sericulture have been reprinted in the Farmers' Journal.

SERICULTURE.—

A further Report—Imperial Institute No. 3231/23—on the Mulberry silk cocoons sent home in 1921, has now been received. The Report states that :—"The Mulberry silk cocoons from Kenya Colony which are the subject of this report were forwarded to the Imperial Institute by the Chief of the Di-

vision of Entomology, and are referred to in his letter No. 149 of the 21st October 1921."

"The silk-worms producing the cocoons had been raised from "seed" supplied by the Imperial Institute Advisory Committee on Silk Production for experimental cultivation in the Colony, in accordance with an arrangement made with the Entomologist at an interview with the Committee in 1920."

DESCRIPTION.—

The cocoons were of normal appearance, clean, free from stain and mould, cream to pale pinkish-yellow externally and bright yellow within. No pierced cocoons were observed in the sample. The average weight of the cocoons was 0.5 gram.

RESULTS OF EXAMINATION.—

The cocoons were found to vary from 1.2 to 1.5 inches in length, with an average of 1.3 inches, and from 0.6 to 0.8 inch in diameter, with an average of 0.7 inch. They consisted of silk 44% and chrysalis 56%.

The diameter of the double fibre (or "bave") measured from 0.0006 to 0.0013 inch with an average of 0.0010 inch, and that of the single fibre (or "brin") from 0.00025 to 0.0006 inch with an average of 0.00045 inch.

After being freed from chrysalides the cocoons contained 9.4% of moisture, and lost 27.8% by weight (express on the moisture freed silk) on degumming by boiling with a 1% soap solution. The degummed silk was practically white and appeared to be normal in strength and general properties.

The cocoons were inspected by the Imperial Institute Advisory Committee on Silk Production, who described them as clean, well-shaped, and of good appearance. The actual quality of the silk could not however be definitely determined, except by carrying out practical trials, and though the quantity of cocoons available was insufficient for weaving tests, the Committee arranged for a preliminary reeling trial to be carried out at a filature in Lyons.

In the report on the results of this trial, it was stated that the cocoons were irregular in size and very hard when immersed in the reeling basins, so that the reeling operation was difficult. The yield of silk was satisfactory, but the product obtained was coarser than would have been expected from the satisfactory appearance of the cocoons.

The reeled silk was submitted to the Official Conditioning House at Lyons for examination, and was found to be of good **tenacity** but only moderately satisfactory as regards elasticity.

COMMERCIAL VALUE.—

The silk obtained in the reeling trials was considered by the Imperial Institute Advisory Committee to be of promising quality. It was described as a soft silk which appeared to be somewhat gummy, a condition which would result in additional loss when the material is degummed before being made into yarn. The thread was clean, but possessed little brilliancy as compared with first quality European Silks. The silk was valued at Shs. 31/- per lb. in the United Kingdom (March 1923.).

REMARKS.—

It would be unsafe to generalise on the basis of the present small sample of cocoons, but it may be stated that on the whole the results are satisfactory for a first trial. The defects of the cocoons as reported by the reelers would no doubt disappear as further experience is gained in raising and feeding the worms under the conditions obtaining in Kenya. The general character of the silk was very promising, and in this case also, improvement may be looked for with increased experience.

The Imperial Institute Advisory Committee consider it very desirable that the experiments with mulberry silk worms should be continued in Kenya, as a final test of a silk can only be obtained as a result of weaving trials with a bulk consignment. If a consignment of cocoons can be sent to the Imperial Institute, it will be possible to arrange for further reeling trials and for weaving experiments with the silk obtained. Not less than 100lb. of cocoons would be required to supply sufficient silk for complete weaving experiments, but if this quantity is not likely to be available for some time, the Imperial Institute will be glad to learn the maximum quantity of cocoons that could be furnished in order to decide whether it would be sufficient for satisfactory trials.

Regarding the general question of the prospects of Sericulture in Kenya, the Committee consider that it would probably not be found remunerative to export the cocoons to Europe for reeling. Moreover in the early stages of the industry the producers would have to be content to receive less than the ruling market price until the quality of their cocoons became recognised. Thus, the current market price of the best French cocoons (dry) is about Shs. 7/- per lb. ex store, Marseilles and Milan, but on this basis cocoons of a similar quality from new sources would not be likely to realise more than Shs. 4/- to Shs. 5/- per lb. at first. Probably the only way to establish a silk industry in Kenya will be for arrangements to be made (possibly by Government) to cover the loss on sales of cocoons.

until a small filature can be established to reel the silk locally. If the silk is of good quality and the reeling properly done the industry should then be remunerative.

25th JULY 1923.

As soon as the Mulberries, which have been brought from Kabete and transplanted here, are able to provide sufficient leaf, an endeavour will be made to obtain the desired quantity of cocoons for further reeling and weaving trials at home.

It should be mentioned that the cocoons reported on above, were raised by the natives themselves with the minimum of supervision and that with the experience now gained and closer supervision, the next lot of cocoons should show a distinct improvement.

ROUTINE.—

1. 419 parcels of plants and seeds were examined at the General Post Office.

2. During the absence of the Plant Import Inspector, two consignments of fruit trees were inspected and passed.

3. 166 applications for permits to import plants and seeds have been scrutinized, passed, or amended.

4. 154 specimens of insects, damaged plants, seeds, etc., have been examined and reported on.

5. Owing to the removal and the amount of field work which had to be done, it was not possible to continue the investigations of the life histories of injurious insects.

6. The collection of insects has been added to and the Entomological Record for the Year is appended.

DEVELOPMENT AND IMPROVEMENT.

1. In January a beginning was made to remove from the Entomological Laboratory at Kabete to the Scott Agricultural Laboratories and by the end of March practically everything had been moved and the Insectory re-erected.

Since then, the new building has been painted, several minor alterations made, and the Laboratory is now well equipped and in full working order.

2. Most of the Mulberry trees—*Morus nigra japonica*—have been transplanted from Kabete.

THE MORE IMPORTANT INSECTS OF THE YEAR.

COFFEE.

SCALE INSECTS.

The Scale Insects found on coffee in Kenya are :—

COCCIDAE.

Diaspinae.

Aspidiotus (Selanaspilus) articulatus, Morg.
Ichnaspis longirostris, Sign.

Coccinae.

Pulvinaria psidii, Mask.
Ceroplastes ceriferus, And.
Ceroplastes rubens, Mask.
Ceroplastes vinsonioides, Newst.
Lecanium (Coccus) africanum, Newst.
Lecanium (Coccus) viride, Green.
Lecanium (Coccus) hesperidum, L.
Lecanium (Saissetia) hemisphaerica, Targ.
Lecanium (Saissetia) subhemisphaerica Newst.
Lecanium (Saissetia) nigra, Niet.

Dactylopinae.

Asterolecanium coffeae, Newst.
Pseudococcus citri, Risso.
Pseudococcus persimile, Newst.
Pseudococcus perniciosus. Newst & Willcox.

Of these, three are major pests, viz.,

Lecanium africanum, *Asterolecanium coffeae*, and *Pseudococcus citri*.

1. *Lecanium africanum*, Newst., (Green Scale) In a Paper read before the Annual General Meeting of the Coffee Planters Union, this scale was described, together with an account of its distributon, its effect on the coffee bush, its life history, the relationship of ants and green scale, the means of dispersal, its natural enemies, and methods of control.

Lime-sulphur at a strength of 3° Baume or specific gravity 1.021, has been found the most successful spray for use against the scale.

2. *Asterolecanum coffeae*, Newst. (The fringed scale) has spread and is doing considerable damage in some districts. A proprietary insecticide, "Agrisol", has given good results. The spray is more effective if applied hot.

3. *Pseudococcus citri*, Risso., (Mealy Bug) This scale attacks the roots, foliage, and berries.

On account of cottony, waxy material secreted by the mealy bugs it is more resistant to most of the methods employed in the control of other scale insects.

During the spraying experiments it was found that an oil emulsion, applied hot, which would readily dissolve the cottony wax, gave the best results. The problem then resolved itself into the selection of a spray which would not only give a good efficiency in killing the bugs, but which would be the least expensive.

Several commercial sprays have been tried by different planters, some with good, some with poor success. "Agrisol" seems to have given the best results, applied hot, with considerable pressure, at a strength of one gallon of Agrisol to 25 gallons of water.

The following Kerosine Emulsion if properly made, and applied hot, has given good results and is reasonably cheap.

Paraffin	2 gallons.
Water	1 gallon.
Sunlight Soap	1½ pounds.

This is the stock solution and is diluted 1 in 15 of water for use.

BORERS.—

Reports of attacks of these insects have been few. There is evidence that in many cases the Yellow-headed stem borer is controlled, to some extent at least, by a Braconid parasite.

LEAF-EATING INSECTS.—

1. The moth, whose caterpillar was responsible for the defoliation of the coffee in the Songhor Area last year, has been identified as a species of *Metadrepana*,

2. *Gonocephalum simplex* has again been responsible for considerable damage but is easily controlled by the use of a poison bait.

THRIPS.—

Diarthrothrips coffeae, Will., has been several times reported. These insects appear usually in the dry weather and the characteristic greyish mottling of the leaves and berries and the subsequent defoliation are diagnostic of an outbreak. Spraying, when the insects are first noticed, with lime-sulphur, at a strength of 1° Baume, or specific gravity 1.007, has been found successful in killing the insects and checking the spread.

The Coffee Leaf-miner—*Leucoptera coffeella*, Staint., This insect is present in most plantations but, except in nurseries, has not been responsible for much loss.

CUTWORMS.—

These are universally distributed and have done considerable damage in nurseries and among freshly planted out young coffee. The commonest species are :—

Euxoa segetis, Schiff.

Euxoa spinifera, Hubn.

Prodenia litura, F.

The usual control methods are :—

1. Hand collection of caterpillars.
2. Use of poison baits.
3. Use of protective "collars".
4. Growing a crop between the rows which is preferred by the cutworm, e.g., beans.
5. Considerable success has been met with in painting the stems, 2 inches below and 3 inches above soil level, with arsenate of lead to which a "sticker" is added.

MOLE CRICKET.—

Gryllotalpa africana, P. de B., Young plants in nurseries have suffered from the attacks of this insect.

THE LARGE BROWN CRICKET.—

Brachytrypes membranaceus, Dru., This cricket, at night, cuts the tips and takes them to its burrow.

Other insects reported during the year have been :—

COTTON.—

This crop is principally grown by natives and the insects forwarded from the Kavirondo country were :—

The cotton boll worm, *Chloridea obsoleta*, L.

The cotton stainer, *Dysdercus nigrofasciatus*, St.

The cotton aphid, *Aphis gossypii*, Glover.

MAIZE.—

- Pseudococcus citri*, Risso., on the roots.
Euxoa segetis, Schiff., Cutworms.
Euxoa spinifera, Hubn., Cutworms.
Epilachna hirta, Thunb., eating the epidermis of the leaves.
Calandra oryzae, Linn., on cobs, in the field.

SWEET POTATO.—

- Diacrisia investigatorum*, Karsch., eating the leaves.
Herse convolvuli, L., eating the leaves.
Cylas formicarius, F., weevil in the tubers.

CITRUS.—

- Papilio demodocus*, Esp., leaf-eating caterpillar.
Icerya purchasi, Maskl., cottony scale.

I have the honour to be,
 Sir,

Your obedient servant.

Thos. J. Anderson,

Entomologist.

ENTOMOLOGICAL RECORD

FOR THE YEAR 1923.

Species marked 'X' are new to the collection.

SIPHONAPTERA.

X *Pariodontis riggenbachi*, Roth., Host, Porcupine, Nairobi, Dr. van Someren.

ORTHOPTERA.

GRYLLIDAE

Gryllotalpa africana, L., Nairobi, May 1923.
T.J.A.

RHYNCHOTA.

COREIDAE

X *Elasmocnema montana*, Dist., Nairobi, May 1911. T.J.A.

PYRRHOCORIDAE

X *Dermatinus limbifer*, St., Nairobi, May 1911, T.J.A.

CERCOPIDAE

X *Homaspis dubasqui*, Lallem., Kabete, 1922. T.J.A.

COCCIDAE

X *Pseudococcus perniciosus*, Newst. & Willcocks., on coffee, Donyo Sabuk.

COLEOPTERA.

CINCINDELIDAE

- X *Cincindela virina*, Dej., Kisumu, 1/19. T.J.A.

HISTERIDAE

- X *Lioderma nudum*, Lew., Entebbe, 4.12.12.
 X *Rhipiphorus buttikoferi*, Rits., S.M.R. May
 1913. T.J.A.
 X *Eutochia pulla*, Er., Naivasha, 2.8.18. T.J.A.

COCCINELLIDAE

- Thca variegata*, F., var. *citrina*, Sic., Kabete,
 26.11.18. T.J.A.
 X *Epilachna drcgei*, Muls., var. *Limuru*, 10.3.11.
 T.J.A.
Epilachna gyllenhali, Muls., *Limuru*, 10.3.11.
 T.J.A.
Epilachna punctipennis, Muls., Nairobi, 1911.
 T.J.A.

CETONIIDAE

- X *Elaphinis xanthosternon*, Bourg., Songhor,
 9/17, F.W.D.
 X *Poecilophila tessellata*, Mos., Sonje Valley,
 14.9.19. F.W.D.

LAGRIIDAE

- Lagria coriacea*, Borchm., Kenya Forest,
 10.2.11. T.J.A.
Lagria villosa, F., Kenya Forest, 10.2.11.
 T.J.A.
Lagria viridipennis, F., *Limuru*, 10.3.11.
 T.J.A.

BRENTHIDAE.

- X *Isoccocephalus rufescens*, Thoms., Entebbe,
 9/12. T.J.A.
 X *Ionthocerus conradti*, Senna., Entebbe,
 9/12. T.J.A.
 X *Pseudocecephalus picipes*, Ol., Entebbe,
 9/12. T.J.A.

LAMIIDAE

Synnupserha variabilis, Hintz., Limuru,
10.3.11. T.J.A.

GALERUCIDAE

X *Gastrida abdominalis*, Chap., Molo, 19.1.22.
T.J.A.

CRIOCERIDAE

Crioceris viridissima, Bryant., Nakuru,
4.11.18. F. W. Dry.

 LEPIDOPTERA.

AMATIDAE

X *Epitoxis amazoula*, Bdv., Kabete, 1.9.21.
T.J.A.

X *Amata chrysozona*, Hmps., Thika, 12.10.18.
T.J.A.

AGARISTIDAE

X *Charilina amabilis*, Drury., Kabete, 1.9.21.
T.J.A.

X *Aegocera mesia*, Jord.,

ARCTIIDAE

X *Spilosoma lutescens*, Walk., Trans Nzoia,
T.J.A.

Secusio strigata, Walk., Kabete, 1.9.21.
T.J.A.

X *Turuptiana*, sp. nov. Trans Nzoia, 5/19.
T.J.A.

NOCTUIDAE

X *Lycophotia ignicollis*, Walk., Kabete, 8.3.22.
T.J.A.

X *Polia renisigna*, Walk., Kabete, 4.8.21.
T.J.A.

Borolia melianoides, Moschl., Kabete, 23.8.22.
T.J.A.

Euplexia azyga, Hmps., Kabete, 6.9.21.
T.J.A.

Laphygma exempta, Walk., Kabete, 17.8.21.
T.J.A.

X *Athetis glauca*, Hmps., Kabete, 16.8.21.
T.J.A.

- Tathorhynchus leucobasis*, B. Bkr., Kabete, 4.8.21. T.J.A.
Tathorhynchus exsiccata, Lch., Kabete, 24.6.22. T.J.A.
Antarchaea fragilis, Butl., Kabete, June 1919. T.J.A.
X *Eustrotia diascia*, Hmpsn., Kabete, 27.6.22. T.J.A.
Eustrotia decissima, Wlk., Serengetti Plains, 7.4.16. T.J.A.
X *Eustrotia camalina*, B. Bkr., Kabete, 1.8.21. T.J.A.
X *Earias insulana*, Bdv., Kabete, 29.7.21. T.J.A.
Tarache leucotrigona, Hmpsn., Kabete, 24.6.22. T.J.A.
X *Eutelia discistriga*, Walk., Kabete, 24.6.22. T.J.A.
X *Pardascena virgulana*, Mab., Kabete, 6.9.21. T.J.A.
X *Catocala fuscিনupta*, Hmpsn., Nairobi, 1912. T.J.A.
X *Ulothrichopus primulina*, Hmpsn., Kabete, 24.6.22. T.J.A.
X *Egybolis vaillantina*, Stoll., Mombasa, 20.6.16. T.J.A.
X *Nyctipao walkeri*, Btlr., Nairobi, 1912. T.J.A.
X *Cyligramma latona*, Cr., Kabete, 18.1.22. T.J.A.
X *Cyligramma magus*, Gn., Kabete, 18.1.22. T.J.A.
X *Mocis repanda*, F., Kabete, 4.8.21. T.J.A.
X *Plusia geminipuncta*, Hmpsn., Kabee, 6.9.21. T.J.A.
Pandesma anysa, Gueh., Kabete, 9/12. T.J.A.
X *Anomis subulifera*, F., Kabete, 25.8.21. T.J.A.
X *Anomis flava*, F., Serengetti Plains, 6.4.16. T.J.A.
Hyperba jussalis, Walk., Kabete, 6.9.21. T.J.A.
X *Raparna tritonius*, Hmpsn., Kabete, 27.6.22. T.J.A.
X *Leiorhynchus atirena*, de Joann., Kabete, 27.6.22. T.J.A.
X *Barcia incidens*, Walkr., Kabete, 7.8.21. T.J.A.
X *Orthreis materna*, L., Trans Nzoia, 5/19. T.J.A.

LIPARIDAE

- X *Dasychira georgiana*, Fawc., Kabete, 20.9.14.
Caterpillar on Wattle.
- X *Laelia diascia*, Hmps., Kabete, 17.8.21.
T.J.A.
- X *Aroa discalis*, Hmps., Kabete, 25.8.21.
- X *Nygmia* sp. nov. Kabete, 1.9.21. T.J.A.
- X *Pterodoa tavetensis*, Holl., Serengetti Plains,
2.6.16. T.J.A.

HYPSIDAE

- X *Amphicallia tigris*, Btl., Nairobi, 6/22, T.J.A.
- X *Argina leonina*, Wlk., Kabete, 30.7.21 T.J.A.

SPHINGIDAE

- X *Basiotheca medea*, F., Kabete, 14.1.22. T.J.A.
- X *Nephrole van*, Walk., Kabete, 4.2.22. T.J.A.

GEOMETRIDAE

- X *Prasinocyma geminata*, Prout., Kabete,
17.8.21. T.J.A.
- X *Prasinocyma neglecta*, Prout., Kabete, 2.8.21.
T.J.A.
- X *Neromia articulicornis*, Prout., Kabete,
1.8.21. T.J.A.
- X *Scopula dapharia*, Swinh., Kabete, 3.9.21.
T.J.A.
- X *Scopula erinaria*, Swinh., Kabete, 6.9.21.
T.J.A.
- X *Scopula internata praeruptorum*, Prout., Ka-
bete, 1.8.21.
- X *Rhodometra intervenata*, Warr., Kabete,
1.8.21. T.J.A.
- X *Xanthorhoe exorista*, Prout., Kabete, 7.8.21.
T.J.A.
- X *Coonotephria prasinaria*, Warr., Kabete,
7.8.21. T.J.A.
- X *Horisme minuata*, Walk., Kabete, 3.9.21. .
T.J.A.
- X *Eupethecia fumitacta*, Warr.,
- X *Hydrelia flavicoma*, Warr., Kabete, 7.8.21.
T.J.A.
- X *Hydrelia inutilis*, Prout., Kabete, 6.9.21.
T.J.A.
- X *Gonodontis creberrima*, Guen., Kabete, 6.9.21.
T.J.A.
- X *Macaria rectistriaria*, H-Sch., Kabete, 6/19,
T.J.A.

- X *Macaria fulvimargo*, Warr., Kabete, 30.7.21.
T.J.A.
- X *Discalma subcurvaria*, Mab., Kabete, 18.1.22.
T.J.A.
- X *Osteodes warreni*, Prout, Kabete, 23.7.21.
T.J.A.
- X *Syrrhodia leucicolor*, Butl., Kabete, 26.6.22.
T.J.A.
- X *Xylopteryx arcuata*, Walk., *albimacula*, Warr.

SATURNIDAE

- X *Thyella zambezia*, Feld., Mombasa, 1913.
T.J.A.
- X *Epiphora mythimnia*, Westw., Kabete, 1913.
T.J.A.
- X *Bunaea phaedusa*, Drury., Nairobi, 1912.
T.J.A.

BRAHMAEIDAE

- X *Brahamaea maculata*, Cete., Nairobi, 1911.
T.J.A.

ARBELIDAE

- X *Metarbelodes obliquilinea*, B.Bkr., Kabete.
19.1.22.
- X *Metarbela nubifera*, B.Bkr., Masara, 1.3.22.
H.E.B.

LASIOCAMIDAE

- X *Bombycopsis conspersa*, Auriv., Masara,
22.6.21.
- X *Chilena marshalli*, Auriv., Kabete, 22.6.21.
T.J.A.

ZYGAENIDAE

- X *Neurosymploca xanthosoma*, Jord., Nairobi.

PRYALIDAE

- X *Etiella zinckenella*, F., Kabete, 16.8.21, T.J.A.
- Aglossa basalis*, Walk., Kabete, 6.9.21.
- X *Hapalia ferrugalis*, Hubn., Kabete, 29.1.21.
T.J.A.
- Sceliodes laisalis*, Walk., Kabete, 1.9.21.
T.J.A.
- X *Hellula undalis*, Fabr., Kabete, 29.7.21 T.J.A.
- X *Zebionia phenice*, Cram., Kabete, 3.9.21.,
T.J.A.

ETHMIIDAE

- X *Ethmia spyraethodes*, Meyr., Kabete, 2.8.21.
T.J.A.

DIPTERA

BOMBYLIIDAE

- X *Thyridanthrax ternarius*, Bezzi., Juba River, 27.7.22. Dr. Beven.
- X *Exoproposopa*, sp., Neboi, 6.6.22, Dr. Beven.
- X *Systoechus robustus*, Bezzi., Neboi, 9.6.22. Dr. Beven.
- X *Dasythrix brachyptera*, Lw., Neboi, 6.6.22. Dr. Beven.
- X *Dasythrix* sp., not in B.M.

TABANIDAE

- Corizoneura distincta*, Ric., Isiolo, 21.4.22.
- Pangonia magretti*, Bezzi., Isiolo, 21.4.22. Dr. Beven.
- Pangonia elongata*, Ric., Isiolo, 21.4.22. Dr. Beven.
- X *Pangonia beckeri*, Bezzi., Bulessa, 3.5.22.
- Tabanus biguttatus*, Wied., N.F.D. 27.7.22. Dr. Beven.
- Tabanus africanus*, Gray., Alexandra, 30.7.22.
- X *Tabanus diversus*, Rie., var. *lufirensis*, Beq., Juba River, 30.4.22. Dr. Beven.
- X *Tabanus morsitans*, Rie., Neboi, 12.6.22. Dr. Beven.
- Haematopota mactans*, Aust., N.F.D. 16.6.22. Dr. Beven.
- Haematopota noxialis*, Aust., Kabete, 31.10.18. T.J.A.

SYRPHIDAE

- Protelocera aesacus*, Wlk., 27.12.12 T.J.A.
- Helophilus capensis*, Macq., Mbuyuni, 25.5.16. T.J.A.
- Syrphus adligatus*, Wied., Kabete, 7.11.17. T.J.A.
- X *Asarcina rostrata*, Wd., Kabete, 24.9.17. T.J.A.
- X *Rhingia pulcherrima*, Bezzi., S.M.R. 23.5.13. T.J.A.
- X *Odontomyia azurea*, Beck., Trans Nzoia, 3.5.19. T.J.A.
- Ceria gambiana*, Saund., Kenya Forest, 13.2.11. T.J.A.

ORTALIDAE

- X *Loxocera rufa*, Lw., Sonje Valley, 14.9.14.
T.J.A.

ANTHOMYIIDAE

- X *Caricca inequivitta*, Mall., Kabete, 19.2.13.
T.J.A.

MUSCIDAE

- Glossina pallidipes*, Aust., N.F.D. 7/22.
Dr. Beven.
Glossina longipennis, Corti., N.F.D. 4/22.
Dr. Beven.
Glossina brevipalpis, Newst., Uaso, 28.4.22.
Dr. Beven.
Glossina austeni, Newst., N.F.D. 29.7.22.
Dr. Beven.
Auchmeromyia luteola, F., Meru, 5.4.22.
Dr. Beven.
Stomoxys calcitrans, L.
Lyperosia minuta, Bezzi, N.F.D. 27.7.22.
Dr. Beven.
X *Musca albomaculata*, Macq., Dolo, 22.6.22.
Dr. Beven.
X *Morellia nilotica*, Lw., Kabete, 27.12.18.
T.J.A.
X *Morellia prolectata*, Wlk., Kabete, 30.11.19.
T.J.A.
X *Calliphora antarctica*, Sch., Kilolo River,
16.2.11. T.J.A.
X *Ochromyia depressa*, Wlk., Maktau, 25.2.16.
T.J.A.
Chrysomyia marginalis, Wd., Kabete, 4.12.18.
T.J.A.
X *Orthellia splendida*, Adams, Kabete, 23.12.18.
T.J.A.
X *Orthellia rhingiaciformis*, Vill., Kabete,
5.2.18. T.J.A.
X *Orthellia cyanea*, F., Mount Kenya, 22.2.11.
T.J.A.
X *Orthellia albigena*, Str., Kabete, 13.10.18.
T.J.A.
X *Pyrellia albocuprea*, Vill., Aberdares, 28.2.11.
T.J.A.
X *Pyrellia ruficauda*, Mall., Kenya Forest,
7.2.11. T.J.A.

TACHINIDAE

Eutachina xanthaspis, Wied., Dolo, 22.6.22.
Dr. Beven.

OESTRIDAE

X *Oestrus asininus*, Brauer., Neboi, 19.6.22.
Dr. Beven.

HIPPOBOSCIDAE

Hippobosca camelina, Leach., Uaso, 2.5.22.
Dr. Beven.

Hippobosca capensis, Olf., Uaso, 2.5.22.
Dr. Beven.

Hippobosca maculata, Leach., Neboi, 9.6.22.
Dr. Beven.

ANNUAL REPORT

OF THE

MYCOLOGIST FOR THE YEAR 1923.

The Hon'ble The Director of Agriculture,
Nairobi,

Sir,

I have the honour to submit herewith my annual report for the year 1923.

STAFF CHANGES.—

I left Nairobi on April 17th en route for leave in England and I arrived back on October 26th.

TRAVELLING.—

42 days were spent away from Nairobi apart from the above leave period.

In February and March a visit was paid to Mr. W. J. Dawson's farm at Nioro in connection with flax-retting experiments. During intervals in this work several farms in the Rongai, Nioro and Nakuru districts were visited.

In November and December an extended tour embracing parts of the Kaimosi, Uasin Gishu, East and West Trans Nzoia and Lunhwa areas was carried out mainly in connection with Coffee Berry Disease and Pink Disease.

Altogether 52 farms were visited during the year.

CORRESPONDENCE.—

Inward letters numbered 260,—outward letters 203.

Enquiries were dealt with regarding disease in various field and garden crops, orchard trees, shade trees and ornamental flowering plants. Advice was given on the making of spraying liquids and certain matters of a purely botanical nature, such as the identification of plant specimens, were reported on.

Largely by means of the Imperial Bureau of Mycology, information as to the latest known distribution of certain important diseases was obtained for future reference with regard to plant importations from other countries.

EXPERIMENTAL WORK.

The investigation of the Coffee Berry Disease of the Uasin Gishu Plateau and Trans Nzoia districts was under investigation during the year both in the laboratory and in the field.

Numerous artificial cultures were made from diseased material collected on several farms and as a result it was found that a particular fungus developed in a large percentage of cases.

Three separate attempts were made to inoculate this fungus into coffee growing at Kabete and in a few instances only, diseased berries, showing typical symptoms, were obtained. The proportion of successful inoculations was not considered sufficient however to justify the conclusion that the parasite responsible for the Coffee Berry Disease had been definitely found. There is, nevertheless, considerable evidence that the fungus used in the inoculation experiments is actually the one concerned in the disease and arrangements have been made to carry out further inoculations in the affected districts as it is felt that the conditions at Kabete were considerably more favourable to the coffee than to the fungus.

The exact identification of the fungus has presented some difficulty owing to the fact that during the tour of investigation of November 1922 no fungus fructifications were found on the diseased berries. During the visit paid to the affected districts in November 1923, however, coffee berries were found on one farm bearing fructifications of the fungus *Colletotrichum coffeanum* and it is believed that the organism obtained in artificial culture is identical with it. Work is at present in hand to confirm this opinion.

Colletotrichum coffeanum is not new to the Colony. It has long been known as the cause of minor leaf and berry spots (the latter quite different in appearance from the present disease) and sometimes associated with Dieback. It has always, however, been considered as a weak parasite (both here and in Uganda) requiring conditions adverse to the health of the coffee to enable it to become of serious importance. In this connection it may be mentioned that it has almost invariably been observed that the best-kept plantations are least affected by the Coffee Berry Disease.

An interesting disease which was working considerable havoc in a crop of Madagascar Butter Beans in a Nairobi garden was discovered in March. A fungus was found to be present bearing a resemblance in many respects to *Vermicularia Capsici* which is responsible for a disease of Chile pepper in India. A search of the available literature, however, failed to reveal any previous record of such a fungus attacking beans. It is intended to raise plants of Chile pepper and to inoculate them with the fungus

from the beans in order to discover whether the fungi causing the two diseases are identical. What is believed to be the same disease has since been noticed on pods of the wild plant, *Dolichos lupiniflorus*, common near Nairobi and also on those of Pigeon Pea in neighbouring native shambas.

Immediately after the Bean Disease was reported, spraying experiments were carried out as a result of which the disease was found to be easily controlled by the application of Bordeaux Mixture.

An experimental plot, some two or three acres in extent, of Kaffir Corn, grown at Kabete Experimental Farm was found in January to be so badly affected with disease that no seed could be obtained from it. At first sight the trouble appeared to be an attack of one of the Smut fungi, large black spore masses being found to have taken the place of many of the seeds. Microscopic examination however showed that the fungus did not resemble any of the smuts of the various species of *Sorghum* nor did it appear to agree with any of the fungi causing well known diseases of the genus. Specimens were therefore sent to the Imperial Bureau of Mycology whence a report was received that the fungus was *Cerebella sorghi-vulgaris* which had not previously been reported from Africa. A previous enquiry addressed to the Division of Botany at Pretoria had elicited the information that the disease was not known in South Africa whence the seed had been imported, so that the origin of the infection remains a mystery.

So far *Cerebella sorghi-vulgaris* has not been found attacking the native mtamas of this country which are closely related to Kaffir Corn, but experiments are being undertaken to ascertain whether any of them are susceptible to the disease.

In last year's report it was mentioned that at the close of the year a sample of quicklime which was expected to prove suitable for spray making purposes was under test. The tests which were carried out showed that such well-known spray liquids as Bordeaux Mixture and Lime-Sulphur could be made quite satisfactorily with the sample of quicklime submitted, this being the first occasion on which (at least within my experience) quicklime of the requisite quality necessary for spray making had been known in Kenya. By a coincidence a sample of quicklime believed to be of similar quality, from another firm was submitted for examination just at the close of the year under review. The material in both the above cases came from Nairobi district but it is hoped to discover sources of supply in other areas so as to increase the range of sprays available to settlers in all parts of the country.

Early in the year dust spraying experiments on coffee were carried out on a small scale but the results were not encouraging.

No powder mixture experimented with was found to adhere well to the coffee leaves, a week or so after the dusting there being little trace of the material. A special dust spray has since been received from a South African firm and it is intended to test this in the 1924 rains.

In conjunction with the Director of Chemical Research and Mr. W. J. Dawson experiments in the water retting of flax were made in February and March at the latter's farm at Njoro.

The influence of raising the temperature of the retting water, changing the water at special times during the ret, pressing the flax before scutching, etc., was investigated and it was thought at the time that a considerable improvement had been effected, together with a marked saving in time and labour compared with the "dew-retting" method. Reports on the flax samples sent home to Irish flax spinners however did not indicate any special improvement in spinning qualities. In spite of this, a great deal of information with regard to the water-retting problem in Kenya has been accumulated and it is regarded as by no means insoluble. The work in the past had been carried on under difficulties which made progress slow and these have been added to during the year by the waning interest in flax owing to market depression, by the closing of the Government Farm at Kabete and by the departure from the colony of the Director of Chemical Research.

ROUTINE WORK.

During the year four meetings of settlers were held in the Uasin Gishu, Trans Nzoia and Kaimosi districts. These were attended by about 130 settlers and addresses were given on the subject of coffee diseases, with special reference to the chief ones in each particular district.

An article on Pink Disease in Coffee was prepared for publication in the local press.

The usual inspections of plants imported through the parcels post were made on the arrival of mails in Nairobi.

SPECIAL WORK.

During my leave I spent a short period at the Linen Research Institute, Lambeg, near Belfast where I studied the research methods employed with regard to the water-retting of flax. Except in matters of detail, which were naturally more elaborate at such an Institute, the lines along which the work was being carried out were found to be similar to those used in the experiments in this country.

My return to this country was made via South Africa where I broke my journey to visit the mycological laboratories of the Division of Botany at Pretoria and Durban. At these places a study was made of the South African diseases of crops such as Cotton, Citrus, Sugar Cane, etc., common to that country and Kenya. A variety of mycological problems was discussed with various officers of the Division of Botany and much useful information was obtained.

GENERAL OBSERVATIONS AND REMARKS.

Five diseases were reported for the first time in this colony. They were as follows:—

- Pink Disease of Coffee (*Corticium Salmonicolor*).
- Bean Disease (*Vermicularia Capsici*?)
- Kaffir Corn Disease (*Cerebella Sorghi-vulgaris*).
- Celery Late Blight (*Septoria Petroselinii* var. *Apii*).
- Apple Root Disease (*Botryodiplodia Theobromae*).

With regard to the last it may be mentioned that the fungus *Botryodiplodia Theobromae* is a widely distributed soil dwelling organism of the class of weak parasites. It is known in other countries on a number of hosts and its discovery in Kenya came as no surprise.

In January, the mycological laboratory at Ainsworth Hill, Nairobi, was vacated and the work was transferred to new quarters at what is now known as the Henry Scott Agricultural Laboratories. Among other advantages of this new arrangement it has been found a great convenience to be able to discuss mutual problems directly with other scientific officers without the delays previously necessitated by journeys and correspondence.

I have the honour to be,
Sir,

Your obedient servant,

J. McDONALD,

Mycologist.

APPENDIX "F".

THE ANNUAL REPORT
OF THE
PLANT BREEDER FOR 1923.

Ref. No. 5/2.

February 11th, 1924.

The Honourable,
The Director of Agriculture,
NAIROBI.

Sir,

I have the honour herewith to submit my Report for the year January to December, 1923.

STAFF CHANGES.

I was absent on leave from July 12th, until the end of the year.

Mr. E. V. Stobbs was appointed Junior Clerk and took up his duties on April 3rd.

TRAVELLING.

Njoro and Machakos were visited in connection with wheat breeding and trial experiments.

CORRESPONDENCE.

Consisted of 132 Outward Letters.

92 Inward Letters.

Applications for wheat, maize, barley and oats were dealt with, as also were enquiries on the suitability of particular varieties for individual farms.

EXPERIMENTAL WORK.

Three rod rows of 425 cultures of wheat were sown in triplicate on the Kabete Laboratory Farm for yield and rust trials during the long rain season.

In addition 70 pure line cultures of "Droop" wheat were sown in bulk for multiplication.

Certain selections from this wheat will be issued to farmers for use in 1924. This wheat is generally rust-resistant and the grain similar in appearance to that of Cross XI. The selections were made from a number of varieties grown by me at Kabete Experimental Farm in 1921. "Droop" is the first pure wheat bred by this Branch of the Department, and is so named on account of a characteristic drooping of the ear when ripe.

Several crosses have been made this year and the F 1 and F 2 generations of previous crosses were grown in the breeding cage at the Henry Scott Agricultural Laboratories.

Selection work was started on a useful wheat known as Bobs Rieti.

The F 1 generation of last year's crosses were grown at Natai Emuin Farm, Njoro, and also some special selections. 147 cultures of wheat which have appeared promising during the last two years at Njoro were again sown there for yield trials and multiplication and a further test of their rust-resistance.

GENERAL OBSERVATIONS AND REMARKS.

During January of the year under review the Plant Breeding Branch was transferred from Kabete Experimental Farm to the Henry Scott Agricultural Laboratories.

Owing to my absence on leave during the whole of the latter half of the year, it has not been possible to tabulate in this Report the results of the experimental work initiated by me prior to my departure.

I have the honour to be,

Sir,

Your obedient servant,

G. J. L. BURTON,

Plant Breeder.

APPENDIX "G".

ANNUAL REPORT
OF THE
SENIOR COFFEE OFFICER
FOR 1923.

DEPARTMENT OF AGRICULTURE.

P. O. Box No. 323,

NAIROBI, 4th January, 1924.

NAIROBI.

The Hon'ble The Director of Agriculture,

Sir,

I have the honour to submit my annual report for the year ending 31st December, 1923.

STAFF. There are no changes to report.

TRAVELLING.

During the period under review I was absent from Head Office, on duty, for 169 days. I travelled by car 5,189 miles on Government Service.

FIELD DEMONSTRATIONS.

Fourteen demonstrations were given in the following districts:—Kyambu, Thika, Nyeri, Koru, Kaimosi, Uasin Gishu and Trans Nzoia, besides this, numerous minor demonstrations were given in pruning in all the districts visited.

MEETINGS.

I attended several committee meetings of the Coffee Planters Union and at the Annual General Meeting held on the 25th July, I spoke on the Agobiada and four stem system of pruning. I was also a member of the sub-committee appointed to arrange the Coffee exhibits for the forthcoming Empire Exhibition.

INTERVIEWS.

I held in my Office 452 interviews with Coffee Planters, Merchants and visitors to the Colony.

CORRESPONDENCE.

The correspondence included 472 letters dealing with the cultivation of the crop, diseases and pests, etc.

STATISTICAL RECORDS.

From statistical information obtained as at the 30th June, 1923, the total area planted was 52,249 acres of which there are:—

Up to 3 years of age.	..	25,472
3 to 6 years of age	..	9,649
6 years and over	..	17,128
Total		52,249 acres.

This figure shows an increase of 8,890 acres over last year's statistical return.

Considerable developments have taken place in Thika (Ithanga and Makuyu) and the Plateau (Nandi Border and Trans Nzoia) and continued big developments have taken place in Kyambu.

The total production of clean Coffee for the Season 1922-23 (July-June) was 90,166 cwts and "Buni" 8,191 cwts. giving a total of 98,357 cwts. of Coffee. The estimated production furnished in last year's Statistical Report was 99,582 cwts. thus making a difference of 1,225 cwts. between the actual production and the estimate.

INSPECTIONS.

The following is a summary of Districts visited during the year, showing the number of plantations inspected, number of visits made and the number of plantations affected with Fungoid Diseases and Pests.

District.	Fungoid Diseases.					Cause unknown.	Insect Pests.												
	No. of plantations visited.	Second, third and fourth visits.	Total No. of visits.	Root Rot.	Leaf Spot Disease.		Leaf Disease.	Black Blight.	Pink Disease	Plateau Coffee Berry Disease.	Empty Berries in Kyambu.	Borers.	Asterolicanium.	Mealy Bug.	Green Scale.	Antestia.	Cutworms.	Thrips,	Leaf Miner Moth,
Kyambu.	40	18	58	1	1	20	16	—	—	—	4	1	1	—	17	1	4	5	40
Ruiru.	8	5	13	—	—	8	6	—	—	—	—	—	1	5	5	1	—	1	8
Ngong.	7	3	10	3	—	2	4	—	—	—	—	—	—	5	2	—	—	—	7
Limuru.	5	1	6	—	—	—	2	—	—	—	—	—	—	2	4	2	1	4	4
Thika.	40	14	54	—	9	28	23	—	—	—	—	3	3	24	4	12	13	32	32
Nyeri.	15	—	15	—	—	9	9	—	—	—	—	—	—	9	—	—	—	—	12
Machakos.	3	—	6	—	—	1	1	—	—	—	—	—	—	1	1	—	—	—	2
Sotik.	8	—	8	1	1	4	7	—	—	—	—	—	—	7	—	3	—	—	6
Buret.	3	3	6	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—
Kericho.	3	1	4	—	—	1	—	—	—	—	—	—	—	1	—	—	—	—	1
Lumbwa.	10	1	11	—	1	2	2	1	—	—	—	1	2	2	2	2	1	—	7
Fort Ternan.	4	—	4	—	3	4	—	—	—	—	—	—	—	—	—	1	—	—	4
Koru.	8	1	9	—	8	8	2	—	—	—	—	—	—	3	—	—	8	8	8
Eldama Ravine.	5	1	6	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	2
Rongai.	2	1	3	—	—	1	—	—	—	—	—	—	—	—	—	—	1	—	2
Parklands.	3	—	3	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	3
Kaimosi.	7	1	8	—	2	3	1	3	—	—	—	1	—	2	—	—	—	—	4
Uasin Gishu.	34	11	45	—	1	9	6	—	15	—	—	2	1	6	1	—	4	12	12
Trans-Nzoia.	50	5	55	—	12	11	14	—	4	—	—	—	1	14	—	—	6	14	14
	255	66	321	5	39	112	94	4	19	4	1	9	7	100	13	33	38	168	168

In comparison with previous years, Fungoid diseases and Insect pests are on the increase. Pink disease was recorded for the first time and the "Empty Berries" found in Kyambu (the cause of which is at present unknown) was present last year, but it has increased considerably this year.

34 Coffee plantations were found in a very dirty condition, in some cases, the Coffee was completely neglected. Instructions under the Diseases of Plants Prevention Regulations, 1921, have been issued in the cases where it was considered necessary.

EXPERIMENTAL.

A considerable amount of progress is being made in connection with the Agobiada system. The four stem system does not appear to be so popular, but under certain conditions, especially where climatic conditions are humid and growth vigorous, the four stem system has certain advantages over the Agobiada system. Trials are being carried out, with the idea of converting.—

- (a) A single stem tree into four stems.
- (b) do. into two stems.
- (c) do. into three stems.

The single stem trees were pruned on Central American lines but owing to the unbroken shape of the tree, the new shoots grew very "lanky" and so were not satisfactory. As an alternative all the primaries on one side of the single stem trees were cut away and the growth of the new shoots were much improved—care should be taken to see that the surplus shoots are not taken off too soon as this will encourage the chosen shoot or shoots to grow very lanky. In the case of converting into a four stem system, one shoot or upright should be left and capped when about two feet in height. Up to the present the experiment is not sufficiently mature to advise Coffee planters to adopt this method.

In the case of converting to a two stem system, the old trees were stumped and two suckers on opposite sides of the stump were selected as soon as they made their appearance.

The result of this experiment is most satisfactory and it would seem that the soundest method to adopt in converting old single stem trees to either two, three or four stems is to stump the trees about 8 inches from the ground.

Very large areas of young coffee during the last twelve months have been treated on Agobiada lines, the oldest Agobiada trees in the country are up to the present giving every satisfaction. There has been some difference of opinion regarding training the shoots on the Agobiada system. The most satis-

factory method (judging from the result of an experiment) is to leave two suckers nearest the roots on opposite sides of the parent tree and the other upright a few inches above. As to whether the bend should be as acute as possible is a matter of opinion, so far I have not seen where the advantages are gained in making the bend very acute, in fact on the contrary as very often the coffee plants have to be protected against Cutworms and if shields are used as a precaution against this pest an acute bend will render them liable to cutworm damage.

SPACING.

The result of an experiment instigated by me six years ago has now matured with very good results, *i.e.*, planting coffee 10 x 5 feet. The original intention was to train the trees spaced 10 x 10 feet on the four stem system and the intermediate trees to be left on the single stem to be treated as a catch crop until the fifth or sixth year when they should be dug out.

As regards training the trees on the four stem system this was not carried out, all the trees being left on the single stem.

The increase of yield was most marked and will more than compensate the digging out of the intermediate trees.

This system of spacing is being recommended by me, except that under certain conditions the spacing advised is 8 x 5 feet.

It is pointed out that besides getting a larger return per acre when the trees are young, it is possible to adopt either the Agobiada or four stem system without any risk of serious loss. Whether the spacing be 8 x 10 feet or 10 x 10 feet Agobiada or four stem system might be adopted, and the intermediate plants left on the single stem. At the end of five or six years there will be the trees trained on two different systems, and the trees trained on the system which appears to give the least satisfactory results will be dug out.

VARIETIES.

Jackson's Hybrid and Kent's Arabica are both giving good results regarding growth, though I have had no official report on the liquoring qualities of either.

Arrangements have been made to establish small plots of different types of coffee at the Scott Agricultural Laboratories. Nurseries of the following have been planted:—Jackson's Hybrid, Kent's Arabica, Blue Mountain and Mocha. Nurseries of the above were established at Kabete for the same purpose and they were just the right size and age for planting out last long rains, but as the land at the Scott Agricultural Laboratories was not prepared these plants had to be disposed of. Unfortunately the Coffee plants in the nurseries at the Scott Agricultural Laboratories will not be ready for planting out during the long rains of 1924, owing to the unavoidable delay in making the nurseries,

SHADE.

The artificial shade, explained in my annual report of last year, which is erected on Messrs. Tarlton & Hemsted's estate, Uasin Gishu District, has proved that shade is most essential in that part of the country, but as to whether artificial shade will prove more beneficial than tree shade is a matter yet to be proved and which can only be found out after several years' trial.

The coffee trees under this shade have made a more open growth, thereby eliminating a certain amount of pruning. Mr. Hemsted states that he has never seen coffee trees bearing so heavily in that district as those which are benefiting from the artificial shade.

This experiment was carried out on various lines and it has shown that the best results are obtained when the shade is erected North and South, that is the wire structure running North and South, and making the canopy immediately over the rows of coffee trees thus leaving a space between the rows.

Observations are still in progress regarding this experiment.

Much progress has been made in planting shade trees throughout the coffee growing areas.

As a temporary shade "Muvuli" also known as "Mwethia" a species of *Sesbania*, is giving satisfactory results in certain districts where the rainfall is heavy and hail damage prevalent.

Bananas appear to be more suitable in the drier districts and where the altitude does not exceed 5,500 feet.

The permanent shade trees which are chiefly being planted are *Mukuyu*, *Grevillea robusta*, *Albizia moluccana*, and *Calpurnea aurea*, this latter might also be used as a temporary shade instead of bananas or "Muvule". There is still much to be learned regarding the amount of shade required to give the best results.

Many instances of overshadowing have already been noticed, especially where "Muvuli" has been planted. It has also been noticed that in many cases where temporary shade trees have been planted no steps have been taken to establish permanent shade trees.

PRUNING.

As stated in my annual report of last year, pruning methods can be considerably improved upon. The principal fault being over-pruning and much damage is caused when the trees are "handled" four or five months after pruning. Instead of thinning out a certain amount of surplus growth, a great deal of wood which is required for next year's crop is cut away.

FUNGOID DISEASES.

Root Rot.—Five cases of this disease were noticed and in each case it occurred in old forest land where stumps had been left. A circular regarding the treatment was issued by the Department.

Leaf Spot Disease (*Cercospora*), *Brown Blight Disease* (*Colletotrichum*) and *Phoma*.—In certain districts, the above minor diseases were prevalent, in such cases Leaf Disease is more often than not present and the treatment which is recommended for Leaf Disease should also control the others.

Leaf Disease.—Nearly 50% of the plantations visited this year were affected with Leaf Disease and in all probability if the inspections were made at a different time of the year, this disease would be noticed on plantations which did not appear affected at the time of my visit. In comparison with previous years Leaf Disease is on the increase. A very small percentage of planters adopt systematic spraying and on some plantations where it would appear essential that spraying should be carried out much loss of crop is caused by a severe attack of this fungus. Over-pruning and "handling" is, in my opinion very often the chief cause of Leaf Disease being found in a severe form on many plantations. Judging by the results obtained from spraying as a preventative against Leaf Disease (where it occurs in a bad form) the cost of the material and application is justified.

Black Blight.—This appears on trees affected with scale insects and disappears after the scale is eradicated.

Pink Disease.—Reported for the first time on four plantations, the Mycologist has investigated the outbreak and has written an article regarding the treatment, etc.

Plateau Coffee Berry Disease. Last year this disease was noticed on fourteen plantations, this year the number has increased to nineteen.

It was very noticeable that the disease was most severe on plantations which were in a dirty state of cultivation.

Very few coffee planters carried out the instructions as recommended by the Department, in one instance, however, where the spraying had been done over a large area, the result appeared most satisfactory, some Planters who sprayed (although late in the season) are of opinion that certain beneficial results were obtained, so much so that they are prepared to spray this season.

The Mycologist visited the Plateau and together we inspected most of the affected plantations. He still has the matter under investigation.

Empty Berries in Kyambu. This condition was reported on four plantations, but I have little doubt that there are many more plantations similarly affected. The pulp of the affected berries appears quite normal, but on examination one or both beans are found to be arrested in development.

Specimens have been forwarded to the Mycologist who is investigating the matter.

INSECT PESTS.—

Borers. There are no new outbreaks to report. The one case reported is under control.

Asterolecanium. This scale was found in epidemic form on three plantations and reported to the Entomologist. Much difficulty has been experienced in eradicating this pest but good results however have lately been obtained with Agrisol 1 in 20 applied hot.

Mealy Bug. Reported on seven plantations of which it occurred in epidemic form on two Estates. Numerous spray mixtures were tried and up to the present Agrisol 1 to 24 parts of water has been found most effective when applied hot. The Entomologist has this matter in hand and is carrying out further spraying experiments.

Green Scale. This scale has spread rapidly from plantation to plantation during the last two years. On some Estates the outbreak was in epidemic form.

The Entomologist carried out certain experiments and found Lime Sulphur very effective. Another spray used with satisfactory results was Agrisol. A weak solution of Cooper's Dip was used by one Coffee Planter who states he was satisfied with the results. It has been noticed on 46% more plantations this year than last.

Antestia. Serious outbreaks occurred on a few plantations and there were many more plantations affected than those visited. Hand picking and destroying the bugs and also introducing the coffee bug egg parasite are found the most effective means of control.

Cutworms. In dry districts shields and poison bait are found effective.

In wet districts paper shields are not so satisfactory and where bamboo forests are nearby, bamboo shields can be used with success.

Painting the stem of young plants 2 inches below and 3 inches above ground level with a solution of Arsenite of Lead and water to a consistency of cream has been found effective in some districts.

The Entomologist however recommends that a "sticker" be used to prevent this mixture from being washed off during the rains.

Thrips. Owing to the very good rainy seasons, this pest did not give any cause for alarm, and in each case where it has been reported it only appeared in a mild form.

Leaf Miner Moth. This pest does not appear to cause any material damage.

GENERAL.

Other species of scale found on coffee are the Brown, Black and Waxy scales. These have not been mentioned in my summary of inspections as their occurrence is rare.

The number of plantations affected with scale is 46% which shows an increase of 21% over last year.

Washing channels and Barbecues continue to gain popularity. These, together with more up-to-date methods of preparing Coffee, are on the increase and have a tendency to raise the value of coffee on the London Market. It is pleasing to note that throughout the year good "Nairobi" coffee has been in demand and the prices realised on the whole have been good. From information received it is pleasing to note that the quality generally has shown a considerable improvement over previous seasons, more particularly in the case of shipments during the first half of the season. It is reported from London that the preparation in a good many cases still leaves a good deal to be desired, though many of the older marks are establishing reputations in London for reliability and are benefiting accordingly.

1923 has been a very favourable year for coffee, not only as regards a good planting season, but also as regards the prospects of a good average crop for 1923-24 if the seasons continue to be favourable.

I have the honour to be,

Sir,

Your obedient Servant,

ARTHUR D. LE POER TRENCH,

Senior Coffee Officer.

APPENDIX "H"

ANNUAL REPORT

OF THE

FLAX OFFICER

FOR 1923.

DEPARTMENT OF AGRICULTURE,
NAKURU,
21st February, 1924.

The Hon'ble The Director of Agriculture,
NAIROBI.

Sir,

I have the honour to submit herewith my annual report for the year ending 31st December, 1923.

STAFF CHANGES.

Prior to my departure for Europe on leave in July 1922, the flax advisory and grading staff consisted of three Officers, *i.e.*, Mr. W. G. Scott, Senior Flax Officer, Mr. J. Hughes, and myself Flax Officers. Owing to retrenchment for reasons of economy the services of the two former Officers were dispensed with in September, 1922.

This meant that the original Government Flax Grading scheme of March, 1921, had to be abandoned and it was absolutely essential to the interests of the flax industry that grading should be continued, a Government Licenced Grading Scheme was introduced, whereby both retrenched officers became "Government Licenced graders" and carried on flax grading in their respective areas under the direction of a Flax Control Board consisting mainly of Flax growers.

The fees charged for grading were Shgs. 50/- per ton, or 10/- per ton less than the Government Grading Scheme of 1921, and were retained by the officers in lieu of salary. The Licenced Grading lasted from September, 1922 to April 1923, when Mr. Scott left Kenya, Mr. Hughes having left 3 months earlier,

I returned to Kenya on 22nd January, 1923, and took up my duties in flax advisory and experimental work until 18th April. I was then transferred from the Kabete Experiment Farm to more central Headquarters at Nakuru to take over the grading and advisory work in all the flax districts in the Colony under the control of the Department of Agriculture thus reverting in a measure to the original Government grading Scheme. The only difference being that instead of using the (K) brand on Government graded flax bales the KLG brand (Kenya Licenced Grader) was used for a time.

At the request of a large majority of flax producers the Hon. Director of Agriculture again introduced the original Flax Grading Scheme of 1921 with a large reduction in grading fees much to the satisfaction of producers.

TRAVELLING.

The Kabete Experiment Farm was officially closed in 1922, but from 22nd January to 18th April I was engaged (in addition to up-country advisory tours) in winding up flax experimental and other work thereon. Full particulars as to results, etc., were included in my annual report for 1922.

From 18th April until the end of the year my duties were the rendering of flax grading and general advisory services in the following districts:— Kikuyu, Limoru, Londiani, Gilgil, Solai, Nakuru, Njoro, Eldama Ravine, Lumbwa, Kericho, Sotik and the Uasin Gishu Plateau.

During the above period I was absent from my Headquarters for a total of 165 days on duty in the above-mentioned districts and the total quantity of flax and tow graded, weighed, ticketed and stencilled was:—

132 tons of flax.

141 tons of tow.

which is an approximate average of 22 tons per month of flax and 23½ tons of tow.

Owing to the Licenced graders having left the country after having completed the seasons grading, it was about the end of June before the majority of mills had sufficient straw retted to begin work again thus it is more accurate to average the above quantities over 6 months.

The scale of grading fees decided upon by the Flax Control Board and the Licenced Graders in 1922 were charged during 1923, *i.e.*, Nakuru and Njoro districts Shgs. 45/- per ton, and all other districts Shgs. 50/- per ton, with a flat rate of Shgs. 10/- per ton for tow.

A certain amount of dissatisfaction amongst growers was caused through Nakuru and Njoro districts having cheaper grading rates. This has now been remedied and a flat rate of Shgs. 30/- per ton for flax and Shgs. 10/- for tow is being charged.

The total revenue derived from flax and tow grading during 1923 was Shgs. 8,392/70.

CORRESPONDENCE.

The number of enquiries dealt with on flax matters were approximately 617 inward, 654 outward, and may be divided as follows:—

Grading.	Advisory.	Seed.	Reports, etc.,	General.
218	186	60	56	97

EXPERIMENTAL.

Through the kindness of Mr. W. J. Dawson, Major W. A. Conduitt, Njoro, Messrs. Stanning Bros., Lumbwa, Messrs. Sneyd and Buchanan, Kericho, and Mr. J. J. Toogood, Nakuru, a number of flax variety trials were carried out on their farms.

The varieties under trial were those which according to previous experiments are more or less suited to the Colony, together with a few newly imported strains including an American Pedigree "Saginaw" variety.

At present the experimental results in actual figures are not available chiefly owing to seasonal difficulties and the constant demands on my time for grading but from notes periodically made a fair indication is given as to the commercial value of the various varieties under trial.

The varieties grown on each farm are placed in order of merit with remarks as follows:—

Mr. W. J. Dawson's Farm, Njoro.

Pure Line No. 3. (Irish Department of Agriculture) average length 33 inches, an ideal type of straw, steady even growth, ripened very evenly retaining a perfect colour, showing the least tendency to branch from root, smooth uniform stalks, good straw yield per acre.

Dutch Blue. averaged 36 inches in length, good steady growth, ripened evenly, retaining good colour, slight tendency to branch from roots but not coarse, uniform length, bulked well.

Pure Line No. 5. (Irish Department of Agriculture) Average length 34 inches, uniform in growth and colour, contains about 15% branching stems which are coarse rooted, showing a tendency towards early and coarse branching, will not yield so well as Pure Line No. 3, or Dutch Blue, but will give heavier seed yield.

Japanese. Average length 30 inches, fine uniform straw, good colour, approximately 10% of stalks branched but not coarse or woody, light yield of straw per acre.

Russian (Riga). Average length 37 inches, strong growth, slightly uneven in length, approximately 20% of stalks branched and are woody. This variety will give best straw yield per acre.

"Saginaw". This is the name given to an American pedigree flax seed obtained from the Agricultural Experiment Station, Wisconsin, U.S.A. The quantity of this seed obtained up to the present has been so small that propagation of seed was the first consideration and therefore a record of fibre yield was not practicable.

Although this is a coarse growing type it certainly shows more vigorous growth and stamina than any other variety yet tried in Kenya. It resembles Dutch white Flowering in many ways but is not so woody nor does it branch so much.

The Wisconsin Authorities claim that Saginaw fibre seed is to a certain extent disease resistant, and arrangements are already made to plant part of the above seed on diseased land for the purpose of testing the extent of its immunity. Growing side by side with Russian it stood on an average 9 inches higher and every stalk appeared healthy.

Major W. A. Conduitt's farm, Njoro.

Dutch Blue. Averaged 40 inches in length, practically no branching from root although the single stems were rather coarse and woody. This may be due to the forest soil on which it is grown, ripened fairly evenly, but lost its once promising colour, good yield of straw per acre.

Russian (Riga). Averaged 41 inches in length, strong and vigorous growth, slightly rough stems with woody base, small percentage branched, retained fair colour, heavy crop per acre.

Japanese. Averaged 38 inches in length, a good average type of straw, long and fine, will give a heavier yield of straw per acre than Japanese on other farms, rather heavily branched with numerous seed bolls, smooth stem with good colour.

Pure line No. 3. (Irish Department of Agriculture) Owing to the limited quantity of seed on hand this plot was sown for the propagation of seed. Although it retained its good qualities from a fibre point of view the rich soil on the above farm is regarded as the reason for slightly woody stems in all the plots. The seed was large and well filled. Average length 40 inches.

Pure line No. 5. (Irish Department of Agriculture). The quantity of seed was also limited and the same remarks apply, more branching was noticeable thus producing a heavier yield of seed.

Messrs. Stanning Bros. Farm, Lumbwa.

Dutch Blue. Averaged 43 inches in length, fine "wiry" well grown straw, smooth stems, retained a desirable greenish yellow colour, normal branching, should give an average yield of seed and an abundance of fibre.

Russian (Riga). Averaged 42 inches in length, slightly rough stems of dull green colour, did not ripen well, inclined to branch more than the Dutch grown alongside, should give a good yield of strong but coarse fibre. The yield of seed average, but likely to contain a large percentage of immature seeds.

Irish. Averaged 40 inches in length, approximately 5% of stems branched from root, rather rough and woody, slightly coarse and early branching was noticeable, poor colour, but yield although coarse should be good.

Japanese. Averaged 37 inches in length, a slender smooth stemmed straw, easily "laid" by rain, contained a large proportion of stems too fine for retting and scutching with the bulk, very fine roots and branches. It will not be a heavy yielder of straw per acre but other things being equal should produce a high grade fibre.

Messrs. Sneyd & Buchanan's farm, Kericho.

Pure Line No. 3. (Irish Department of Agriculture). Averaged 38 inches in length, well and uniformly grown, only slight signs of branching from root, branches few and fine, uniform ripening and good colour were its special feature, should produce a high grade fibre.

Pure Line No. 5. (Irish Department of Agriculture) Average length 37 inches, same remarks apply as to Pure Line No. 3, except that stems were not so uniform.

Japanese. Average length 34 inches, very fine quality of medium coloured straw, fine rooted with very little branching, poor yield of straw.

Dutch Blue. Averaged 40 inches in length, good sound uniform straw of fair colour, approximately 15% of stems inclined to branch slightly, not coarse or woody.

Hoshagabad White Linseed. A small quantity of seed of this variety was imported from the Central Provinces of India and issued for trial in Kenya to flax growers in five districts.

This is a white seeded oil variety and produces seed much larger than the brown fibre seed. The plant branches from the root into as many as 8 to 12 stems approximately 20 inches in height, each bearing its quota of seed bolls.

As there has been a steady market for flax seed, or rather "Linseed", during the past two years with an increase in price of £3 to £4 per ton during 1923, it is hoped that the above variety will prove an asset to growers on account of (a) a heavier yield of seed; (b) a higher oil content, (c) that fibre growers are not likely to suffer loss through sowing oil seed for fibre, as the seed varies in colour from white to cream, whilst that of the fibre varieties are of a brown colour,

According to the Linen Research Institute, Lambeg, Ireland, the oil content is over 40% (when grown in India) as against 30% to 34% in the brown fibre seed.

GENERAL REMARKS.

All things considered 1923 was easily the best flax season experienced in Kenya for several years. The rainfall in most districts provided ideal conditions for the growing crops and also for the retting of the straw grown during the previous season.

The crop in every district looked very promising until almost fully grown, when unfortunately, a serious outbreak of caterpillar occurred causing heavy losses to the extent of approximately 1,000 acres in the Njoro district alone. Other districts suffered more or less but the total losses would not exceed that suffered by Njoro.

The losses from wilt disease have also been considerable, Njoro again suffering more than other districts.

The general trend of prices for Kenya flax and tow during 1923 was on the upward grade and towards the end of the year some very satisfactory prices have been obtained.

A fairly complete list of actual sales kindly supplied by the local Representative of a London firm of Merchants, shows an average price of £87-10-0 per ton for grade 3—5 flax throughout the year and £36-15-0 per ton for tow.

The highest flax price being £110-0-0 while twelve other consignments brought over £100-0-0. The highest price for tow being £48-0-0 per ton. About 35 to 40% of the tow handled by this firm was sold at over £40-0-0 per ton.

These prices of course are United Kingdom or Continental sales, from which must be taken the cost of shipping and marketing.

A certain amount of small lots have been sold locally at speculative prices, but where a grower has more than two tons for disposal at a time he usually prefers to take the risk of European markets.

The two chief drawbacks to flax growing in Kenya are the risks of caterpillar and wilt. Growers are fairly satisfied with the prices now obtainable for fair average quality flax and tow, the costs of grading, shipping, and marketing.

It is gratifying to note that during the year 3 new flax mills have been erected in the Molo and Gilgil districts, the machinery for which has been purchased locally from districts which are now known to be unsuitable for flax production.

I have the honour to be, Sir,

Your obedient Servant,

Geo. M. Hamilton,

APPENDIX "I".

ANNUAL REPORT

OF THE

SENIOR AGRICULTURAL SUPERVISOR,

KISUMU.

Department of Agriculture,
Kisumu.

11th February, 1924.

The Hon. The Director of Agriculture,
Nairobi.

Sir,

Native Agriculture, Nyanza Province.

I have the honour to submit my annual report for the year ending 31st December 1923.

STAFF.

Mr. Albrechtsen arrived in Kisumu on April 5th but returned to Nairobi on April 23rd as medically unfit.

Mr. Sheppard arrived on April 8th and proceeded to Kakamega for work in the North Kavirondo District.

Mr. Butler returned from leave on July 15th for duty in the Central Kavirondo District.

The Native staff was increased during the year. Ten selected natives, five from Central and five from North Kavirondo, were sent to Serere School, Uganda, for a short course of instruction on the cultivation of cotton. On their return these Apprentices, although only partially trained, immediately took up their duties in the Reserve. The strength of the Native staff at the end of the year was as follows:— Instructors 6, Apprentices 23.

RAINFALL.

The rains commenced in February and were exceptionally heavy throughout the planting season. There was only a short break between the long and the short rains. Heavy hailstorms did a considerable amount of damage in certain districts, particularly in parts of North Kavirondo.

KIBOS FARM.

As it had been decided to close the Kibos Farm in favour of a centre more representative of the Kavirondo Reserve the farm staff was extensively curtailed and consequently few experiments were carried out.

COTTON.

The cotton planted in August 1922 was harvested in January and February. The following are the yields :—

Variety	Acres.	Yield per acre.
King	2	431 lbs.
Griffen	1	309 lbs.
Bancroft	1	254 lbs.
Uganda Seed	1	183 lbs.

The poor yields are due to too much rain and a waterlogged condition of the soil.

MAIZE.

22 acres of White Congo were planted in order to test the suitability of this type of maize for the locality and to provide sufficient seed for a free issue in 1924. Owing to the exceptionally heavy rains 5 acres completely died off, and the remainder did not thrive well. Only 41 bags were harvested.

PERILLA.

Area.	Date sown.	Transplanted.	Harvested.	Yield.	Remarks.
1/20th acre.	3-4-23	18-5-23	7-7-23	51 lbs.	Average height 1½ feet.

This experiment shows a better result than last year but evidently the heavy Kibos soil is not suitable to the growth of this plant.

ALCORABILLA.

Half the seed supplied was treated as per instructions but did not germinate.

GENERAL.

Besides the cultivation of the annual crops the farm labour were employed in cleaning the sugar cane, banana plantation, and the orchard. The following plants, etc., were either sold or distributed free :— banana suckers, lemons, oranges, mangoes, rain tree seed, mango seed, tobacco seed, matama, pawpaw seed, cassava cuttings, tamarind plants, bamboo cuttings, bougainvilleas, crotons, various hedge seeds, groundnuts, rice, eucalyptus poles, pomegranate plants, sugar cane, beans, chillies, guava seed, and various ornamental shrubs.

STOCK.

Oxen 35. Donkeys 6. All the oxen have been re-inoculated for pleuro-pneumonia. Three young oxen which were exchanged for old animals were inoculated for rinderpest.

BUKURA FARM.

An area of land suitable for the establishment of a training and control centre for Native Agriculture was selected in Maramma location, North Kavirondo. It is situated on the Butere—Kakamega road and is distant from Kisumu 37 miles via Maragoli, and 44 miles via Yala.

The site is well drained, healthy and well watered and a very fine nursery site was included. Chief Mulama and the local natives were shown round the boundaries by the District Commissioner and agreed to the excision of the land for the purpose of an Agricultural Training Station. It was agreed that compensation would be given for the removal of three families and the taking over of some gum trees.

The seed store at Kibos was demolished and is being re-erected at Bukura. The foundations have been laid for the erection of a school and farm shed, and a substantial hut has been built for the Officer in charge. About 15 acres have been cleared and stumped and ploughing has commenced. All implements, etc., have been transferred from Kibos and a number of new implements bought.

AGRICULTURE IN THE RESERVE.

COTTON.

Cotton buying commenced in January. As there were no buyers in North Kavirondo the natives took their cotton to Messrs. Besson at Tororo, Uganda and received Shs. 23/- per 100 lbs. for 1st quality; Shs. 22/- per 100 lbs. for 2nd quality; and Shs. 8/- per 100 lbs. for dirty cotton.

A considerable amount was sold to Indian buyers at Busia at prices ranging from Shs. 16/- to 20/- per 100 lbs. In February the cotton in Central Kavirondo was bought by Messrs. Small and Wilson at Sio at Shs. 16/- to 20/- per 100 lbs. The natives were thoroughly satisfied with the prices given, especially in some districts where they had grown cotton in previous years but could get no sale for it.

In 1923, 65 tons of cotton seed were distributed at the following centres :— Kibos, Homa Bay, Asembo, Sio, Busia, Malakisi and Mumias. Planting commenced during the last week of May.

The large acreage expected in the Kano area was not planted owing to excessive rain. In the dried parts of this district, however, cotton has done very well.

In the Asembo area the first planting partially failed owing to bad germination of the seed. The crop has done exceptionally well in Uyoma, near Asembo, and in Seme but further inland very little was planted.

The cotton in the Sio area was planted early and came up very well. During July a drought was experienced, with the result that the Cotton Aphis attacked the crop and considerable damage was done.

From Okwaras along the Uganda border to Malikisi a large acreage was planted. In this area the natives have shown their keenness by careful cultivation during the growth of the crop and by careful picking. They thoroughly understand the importance of separating the good from the bad cotton at the time of picking. Unfortunately the natives of Central Kavirondo have not shown the same keenness and constant pressure has had to be brought to bear in order to get them to pick their cotton.

The cotton in the Mumias area has not done well. Heavy rain kept the young plants back and later the Cotton Aphis and hail did considerable damage.

Estimated acreage under cotton in 1923 :—N. Kavirondo, 9,000 ; Central Kavirondo, 1,500.

Position of Ginneries at the end of 1923.

Kibos. (Allidina Visram). Store and building complete. Gins being erected.

Asembo. ((B.C.G.A.) complete

Sio. (Mr. Gordon Small) complete.

Okwaras (Mr. Folkes) Store complete, but ginning machinery not arrived.

Malikisi. (B.C.G.A.) Store complete. Ginnery to be erected in 1924.

MAIZE.

An area consisting of South Maragoli and a part of Teriki in North Kavirondo was selected as being the most suitable for a concentrated issue of maize. All native maize in that area was either sold or used as food, the natives promising to plant only the seed issued to them. 38 tons of maize were transported to Munubis camp and issued to the natives in the selected area. In order to ensure that every man would receive enough seed to plant half an acre, the issue was made from the hut tax books. When every man had received his 8 lbs. many returned for a further issue ; this was granted to those

men having more than one hut. The natives agreed to return the same quantity of seed that they received. Although the natives promised to plant only the seed maize issued, a certain amount of native maize was planted; this was overcome by sending several Instructors and Apprentices to supervise the destruction of the native maize. In Headman Aneni's area "White Congo" was issued. This variety has not done very well owing to excessive rain and seems to be a type which will do well in the drier parts near the Lake shore. The remainder of the maize issued, "White Dent" has proved very suitable for the Maragoli district.

Generally the quality of the maize sold in the Reserve was fair, but at the beginning of the season it was much too damp. Every effort is being made to prevent the natives from harvesting immature crops but the problem is a difficult one, the chief reasons being :—

1. As soon as tax collection commences the natives are in need of money.
2. The Indian traders will buy anything which comes along, and in fact sometimes encourage the natives to bring in immature crops in order to fulfil forward contracts.

The acreage of maize for 1923 is estimated at about 20,000 this is very approximate as the natives still persist in planting maize, matama, wimbi, etc., in the same shamba to the detriment of all crops concerned.

12,000 tons of maize were booked at Kisumu station for export in 1923.

Average prices of maize during the season :—

Yala	...	Shs. /84 per 80 lbs.
Asembo	...	Shs. 1/12 per 80 lbs.
Kisumu	...	Shs. 2/50 per 80 lbs.

SIM-SIM.

Six bags were sent to Kakamega and distributed in the surrounding locations as it was considered that this area was too wet and cold for cotton. The simsim crop continues to be a favourite with the native and finds a ready market. It is very suitable for a short rain crop. Four bags were sent to the D.C. Kisii. The estimated acreage for 1923 is about 5,000. During the season the price varied from Shs. 5/- to 6/- per 36 lbs. in Kisumu.

GROUNDNUTS.

Ten bags were issued, 5 to the D.C. Kisii and 5 in Central Kavirondo. The Kisumu price varied from Shs. 4/- to 6/- per 36 lbs.

RICE.

Seven bags of Mwanza rice were issued early in the year chiefly to the natives around Mumias to replace the red type previously grown there, and which does not find a ready market. The present difficulty is the hulling of the paddy. The hand rice huller sent to Mumias has not been a success, a much heavier type being required. Arrangements have been made with some of the cotton ginnery owners to erect power hullers.

WHEAT.

Two bags of Cross 11 were issued to the natives around Kakamega where the conditions are well suited to this crop. Two bags were issued to the D.C. Kisii to replace the mixed wheat grown in the Kisii Highlands.

LINSEED.

Eight bags were distributed, 5 in Kakamega, Kabras, and North Kitosh, and 3 at Kisii.

GENERAL.

On the whole the natives have shown a marked improvement in their agricultural methods except in certain locations where the Chiefs and Headmen are indifferent. A few of the more intelligent natives are showing a keen interest in market gardening, and several demonstration plots containing various vegetables and fruits have been laid out by the Native Instructors.

Four Chiefs and Headmen in North Kavirondo are now using a plough.

POULTRY.

The issue of Rhode Island Red cockerels in Central Kavirondo has been very successful. Some very useful half-bred stock have been reared. A similar issue was made in the Lumbwa Reserve.

SEED ISSUED IN NYANZA PROVINCE IN 1923.

Cotton	...	65 tons.
Maize	...	38 tons.
Tobacco	...	$\frac{1}{2}$ lb.
Chillies	...	1 bag.
Rice	...	7 bags.
Beans	...	3 bags.
Groundnuts	...	10 bags.
Matama	...	3 bags.
Wheat	...	4 bags.
Linseed	...	8 bags.
Simsim	...	10 bags.

The following figures show the amounts of the chief agricultural products which passed through the Customs, Kisumu, from the Gulf Ports of Nyanza Province for the year 1923.

Product.	Kendu. Tons. cwt.	Homa. Tons. cwt.	Asembo. Tons. cwt.	Karungu. Tons. cwt.	Sio. Tons. cwt.	Kadimu. Tons. cwt.	Total. Tons. cwt.
Beans.	14 19	9 14	—	—	—	—	24 13
Chillies.	18 17	—	6 18	—	—	—	25 15
Maize flour.	21 13	4 10	3 11	10 5	1 19	0 13	42 11
Ghee.	1 14	—	—	—	0 4	—	1 18
Garlic.	44 8	323 5	274 13	6 2	0 19	1 2	1,055 9
Groundnuts.	11 4	8 5	5 7	2 11	7 18	—	35 5
Skins.	96 12	96 14	20 8	42 3	30 14	1 8	287 19
Hides.	10 4	83 0	112 8	6 0	7 16	1 18	221 6
Choroko.	285 3	521 3	1,782 15	—	124 6	110 0	2,823 7
Maize.	0 6	—	0 2	—	—	—	0 8
Matana.	1 1	7 11	—	—	—	—	8 12
Onions.	0 2	—	—	—	—	—	0 2
Potatoes.	—	—	—	—	—	—	0 2
Rice.	76 17	731 8	0 2	155 3	270 15	29 2	1,352 16
Simsim.	13 10	4 13	89 11	—	—	—	18 3
Wheat.	76 18	15 16	3 7	—	—	—	95 1
Wimbi.	—	—	—	—	—	—	—

I have the honour to be,

Sir,

Your obedient Servant,

P. BOOTH,

Senior Supervisor.

APPENDIX "J".

ANNUAL REPORT, 1923.

OF THE

AGRICULTURAL SUPERVISOR,

HENRY SCOTT AGRICULTURAL
LABORATORIES.

The Honourable,
The Director of Agriculture.

I have the honour to submit herewith the first Annual Report for Native Agriculture in the Kiambu Reserve and Henry Scott Agricultural Laboratories.

STAFF CHANGES.

Mr. J. W. Sparrow retired on the 19th June 1923.
The undersigned was appointed on the 10th June 1923.

TRAVELLING.

During the seven months of duty, from June to the 31st December, fifty three days were spent in the Native Reserves, including Meru, Embu, Fort Hall, Nyeri, and Kiambu.

Much of the work was advisory and encouragement in fostering increased production and better methods. When meetings were held in Native Locations they were invariably well attended by the Chief and his elders. The principal subjects discussed were, selection of seed, preparation of gardens, rotation of crops, methods of cleaning land and conservation of plant-foods and moisture, harvesting, storing of grain, planting of timber trees, stock, sale of produce, and various minor points. Practical demonstrations were given whenever possible.

The principal crops grown by the Wakikuyu in the Kiambu District are maize, beans, sweet potatoes, potatoes, millet, M'tama and bananas. The present method of mixing all varieties of plants is not helpful to heavy cropping nor good quality of seed. One of the biggest faults is the ineffective harvest which gives a steady breeding ground for insects.

IMPLEMENTS.

The use of implements for cultivation is being encouraged. Ploughs and harrows are being used by a few of the more progressive natives. Hand maize shelling machines are working in a few locations in addition to water driven posho grinding mills in operation while others are under construction.

NATIVE AGRICULTURAL SHOW.

To foster greater keenness amongst the natives for quality of agricultural produce, a Show was held at Kiambu on the 2nd October 1923. This being the first show of its kind in the District, there was considerable difficulty in getting the desired enthusiasm. On the whole the exhibits were well represented, though the quality left room for improvement. Missions were represented and the fine quality of their exhibits clearly showed the result of education.

HENRY SCOTT AGRICULTURAL LABORATORIES.

The original Scott Sanatorium Buildings were fitted to compete with the new requirements, and an additional three stores, a dwelling house, the labour camp, and plant breeding cage, were introduced from the old Experimental Farm at Kabete.

Additional land was got in close proximity to the Laboratories, making an area of some 40 acres in all.

Thirty acres of the Experimental Land were cleared and cultivated, part of which was planted with permanent and temporary crops during the short rains in November.

PERMANENT CROPS.

One acre of a representative variety of fruit trees.

A Mulberry Hedge for Sericulture, 572 yds. long.

A Mulberry Plantation for Sericulture, 2 acres in extent.

A Castor Plantation for Sericulture and Seed. There are 15 varieties of Castor being tried, of three sq. chains each. The seed was received from Fort Hall, Kibos, Kitui, Malindi, Voi, Kiambu, and Nyeri.

TEMPORARY CROPS.

Twenty three varieties of white and red American Maize, and three varieties of red South African Maize were planted in small plots of 176 sq. yds. each.

The remainder of the cultivated land was put under Canadian Wonder and Rose Coco Beans as a means of utilizing the space until the big rains in 1924.

NURSERY.

Samples of Mocha, Jacksons Hybrid, Kents Hybrid, and Blue Mountain Coffee were planted in the seed beds in April. It is anticipated that these varieties will be planted out in the Experimental Land in 1924.

INSTRUCTIONAL.

A series of refresher lectures was given to the six senior Native Agricultural Apprentices to fit them for their duties in the Embu, Nyeri, Fort Hall, and Kiambu Native Reserves.

Sixteen natives were recruited from the Embu, Fort Hall, and Kiambu Reserves for Agricultural Training, five of whom have since been returned, as not likely to become efficient. Most of the boys have had previous schooling at the C.M.S. Missions, the remainder commenced the course uneducated.

Their training embraces all forms of practical farming and planting, with demonstrations. Every afternoon the Apprentices attend school for 2½ hours. During October until the 31st December they had 26 lectures on subjects pertaining to agriculture. Each pupil is allotted a garden of one sq. chain for his own use. The planting of the gardens is original to a certain extent and advice is only given when necessary. The crops grown are, principally, maize, beans, millet, sim-sim, cotton and ground nuts.

I have the honour to be,

Sir,

Your obedient servant,

W. Lyne Watt,
Agricultural Supervisor,

ANNUAL REPORT

OF THE

GRADER AND INSPECTOR,

MOMBASA.

APPENDIX "K".

AGRICULTURAL DEPARTMENT,
Office, of the Grader & Inspector,
Kilindini, January, 1924.

The Hon'ble Director of Agriculture,
NAIROBI.

Sir,

I have the honour to submit my annual report for the year ending 31st December, 1923.

STAFF.

During the year the staff was increased by the addition of Mr. A. R. Teague (October 10th) Grader and Inspector, on first appointment and Mr. S. W. Austin, Clerk, (October 15th) on transfer from Nairobi.

TRAVELLING.

For the purpose of getting first hand knowledge of the methods and organisation in force in Durban with regard to the Grading of Maize, I visited Durban during August and September being absent from Mombasa for nearly a month. My thanks are due to Mr. A. Hirschell, Port Manager, Mr. W. A. Miles Chief Grader, and Mr. A. P. Campfield in charge of the Railway Maize office, for their courtesy and consideration shewn to me during a period when they were extremely hard pressed with work and at the busiest part of the Maize season.

INSPECTION OF PLANT & SEED

IMPORTS.

During the year 1,340 packages of plants and seeds valued at Shgs. 77,799/07 were imported into this Country through Kilindini. Details of these importations are shewn hereunder:—

No. of Packages.	Description.	Value.
234	Fruit Trees.	Shgs. 38,641 . 53
379	Farm seeds.	" 16,514 . 04
389	Garden seeds.	" 12,781 . 69
224	Garden plants	" 7,161 . 67
7	Tea seed.	" 158 . 00
65	Bulbs	" 1,338 . 64
42	Tree seeds.	" 1,203 . 50
		Shgs. 77,799 . 07

Four packages were destroyed on account of infection by disease, and seven packages valued at Shs. 19/32 were confiscated as being prohibited imports. The latter consisted mostly of coffee samples and cotton seed.

EXPORTS.

MAIZE.

The work of collecting samples of maize and of making and recording the moisture contents of these samples started during 1922 was continued up to the end of October. From the results obtained during 1922 and the first three months of 1923, the following statistics for use at the first Maize Conference were compiled:—

District.	No. of tests.	No. of bags for which tests were made.	Average of Moisture.	12.5% % above.	Moisture % below.	13.5% % above.	Moisture % below.
1. Kisumu	32	39,300	13.4%	77	23	57	43
2. Kikuyu, Nairobi and Thika.	5	3,800	15.0%	100	—	64	36
3. Elburgon	5	4,900	13.8%	96	4	84	16
4. Nakuru	25	87,700	11.3%	10	90	4	96
5. Plateau	7	12,400	11.8%	23	77	—	100
6. Fort Ternan	7	4,000	13.4%	100	—	60	40

Note : Nos. 1 and 2 were almost entirely Native Maize. No. 3 Elburgon Maize was Native grown White Maize which still retained a pronounced strain of "Custo" Maize introduced into this country on some previous occasion and distributed in that District. Nos. 4, 5 and 6 were European grown Flat White Maize. At the time that these figures were compiled I did not feel justified in placing too much reliance on the accuracy

of the results obtained for 2, 3 and 6 on account of the small number of tests made, but subsequent observations have shewn that they give a very good indication of the state of the moisture content of the maize from these Districts. The very high results recorded, particularly for the Native and Fort Ternan White Maize influenced the first Maize Conference to fix the maximum moisture content for Maize for export at 14.0%. The Grading authorities in the Union of South Africa considered this to be higher than is desirable, but whether this will prove to be the case or not it is as yet too early to say.

Up till the end of August the results of moisture tests gave a close agreement in the end with those obtained from last year, although at one period much Maize from the Ukamba Province was shipped in a very wet condition but not enough to cause the average for the whole year to alter from 15%. The Kisumu crop was finished by the end of March and the remainder of the European grown crops from Nakuru and the Plateau as was to be expected remained as dry as their previous shipments.

From the end of August I was absent from Mombasa for a period of nearly six weeks, and no moisture tests were made.

On my return from Durban early in October the first part of the Kisumu crop had already been shipped but the remainder has proved to be very much drier than that of the previous year, in the majority of instances being well under 12.5%.

Experiments in connection with Moisture Content

Towards the end of May the moisture content of four bags of maize was determined by the Chemical Research Department in Nairobi, the bags were marked and consigned to the Coast as nearly as possible under the normal conditions of transport. On arrival at M'baraki it was found that the maize had lost on an average 0.75% of moisture on the journey. This same Maize was kept in the Wharf sheds at M'baraki for six weeks, during which time the average moisture content had risen by 0.6%. During the period that this maize was being stored at M'baraki rain fell on 18 days amounting in all to 6.25 inches.

Drying of Maize in the Sun.

Maize which when graded was found to contain more than 14% of moisture was removed from the Grading sheds, emptied from its bags and spread out in the sun on Tarpaulins and left there to dry. In the first case observed the Maize was spread to a depth of six inches and left untouched throughout to dry and in the second case it was spread to twice that depth and

boys were employed turning it over all day with shovels. Similar results were obtained by both methods,

It was found from these experiments :—

(1) That wet maize would lose 1.5% to 2% of moisture per day by being treated as described above.

(2) As was to be expected that the rate of evaporation was quicker at higher moisture contents than at low. That is to say that, conditions of temperature, etc., being constant in each case, maize containing for example 19.0% of moisture would take less time to dry down to 18.0% than maize at 15.0 would to dry down to 14%.

During the first three months of the year 8 bags of maize representative of different districts were collected at Kilindini and sent to Nairobi for use at the Maize Conference which was held in Nairobi on April 24-5th.

As a result of this Conference it was decided that Government should be recommended to apply those parts of the Agricultural Products Ordinance which would bring about the compulsory grading of Maize. This was eventually carried into effect and the compulsory grading of Maize was fixed to commence on 1st November. In the meantime the voluntary issue of Shipping Certificates on the application of the Shipper was continued and no powers were given to Government to prohibit the shipment of maize which for excessive moisture content or other reasons might be regarded as unfit for export. Abnormal rains were experienced up-country in the early part of the year. As a result of this, a quantity of maize was shipped in a very wet condition during the months of April—August. The climax was reached in a shipment of 3,986 bags of maize on the s.s. Carlow Castle in May. Most of the maize on this boat had a moisture content as ascertained by me during the ordinary routine of my experiments of between 16.2% and 18%, in one instance being as high as 23%. The result of this was disastrous. Heating started before the maize left the sheds on Mombasa Island and the temperature steadily rose. By the time that Beira was reached it was found necessary to discharge 2,600 bags which were endangering the other cargo, a temperature of 125°F being recorded between the bags. The remainder of the maize was discharged at Durban in a similar condition. The Agents for the British India and Union Castle Lines fearing that their ships would be delayed for similar causes to those which delayed the Carlow Castle requested me to report on all further shipments of maize by their steamers. I consequently had to recommend that the consignments mentioned below should not be accepted for shipment :—

Date.	Tons	Steamer.	Moisture Content.
July	70	Modasa	17.6%—23.0%
July	25	Gloucester Castle	15.8%
Sept.	35	Chepstow Castle	Damaged by rain. no test made.

Maize Certificates. During the first ten months of the year, during which period compulsory grading of maize was not in force, 96,993 bags of maize were inspected at the request of the Shippers and 32 Certificates were issued at a total charge of Shs. 2,596/56.

In addition to this 26 moisture tests were made at the request of the Shippers and others at a charge of Shs. 130/00.

The following table shows the amount of maize shipped during each month of the year :—

	White.	Native.	Total.
January (ungraded)	19,307	17,141	36,448
February "	46,456	14,318	60,744
March "	62,835	10,536	73,371
April "	23,229	13,834	37,063
May "	17,594	21,795	39,839
June "	6,550	28,069	34,619
July "	—	8,526	8,526
August "	—	14,487	14,487
September "	—	30,968	30,968
October "	13,316	60,736	74,052
November "	5,866	150	6,016
November (graded)	12,040	23,819	35,859
December "	32,110	10,985	43,095
Total	239,303	255,364	495,078

During the first few days of November, ungraded maize was shipped per s.s. "Scholar". This steamer arrived at Kilindini and had completed two thirds of her maize shipments before the first of November, and amongst other reasons the fact that much weevily maize had already been put on board it was decided to allow the shipments to be completed without interruption.

THE FOLLOWING SHIPMENTS OF GRADED MAIZE HAVE BEEN MADE DURING THE MONTHS OF
NOVEMBER AND DECEMBER.

	GRADES.								REJECTED.								
	1	2	3	4	5	6	7	8	F. Wts.	S. W.	Total Graded.	Wet.	Musty.	Weevily.	Other Causes.	Total Rejected	Total Received
November	—	5,108	—	—	20	—	781	1,724	22,857	30,490	1,432	299	3,273	2	5,006	35,496	
December	148	14,473	—	—	—	—	71	8,409	18,276	41,337	2,398	662	2,374	22	5,456	46,833	
TOTAL.	148	19,581	—	—	20	—	852	10,133	41,133	71,867	3,830	961	5,657	24	10,462	82,329	

PARTICULARS OF REJECTED WET MAIZE.

STATION FROM.	NO. OF BAGS WET.	AVERAGE MOISTURE CONTENT.
Fort Ternan.	232	16.9%.
Rongai.	1,348	15.6%.
Kedowa.	85	15.6%.
Menēgai.	223	—
Elburgon.	17	17.0%.
Njoro.	20	17.5%.
Turi.	36	17.0%.
Muhoroni.	14	15.0%.
Nakuru.	305	14.6%.
Lumbwa.	919	16.8%.

BEANS.

Ten certificates for 2423 bags of beans were issued at a total charge of Shs. 200/-. Of these 1,545 bags were Canadian Wonder Beans and 878 bags of Rose Coco Beans.

COTTON SEED.

One hundred and fifty six bags of cotton seed were fumigated prior to shipment and three certificates of fumigation were issued.

POTATOES.

Seven certificates of freedom from Wart Disease (*Synchytrium endobioticum*) were issued covering 1,013 bags of potatoes exported from Kilindini.

I have the honour to be,

Sir,

Your obedient servant,

C. C. Sharp.

Grader and Inspector.

